**440-TP-600-001**

# Reference Guide for Documents Generated for the ECS Project (a.k.a. The Parent Document)

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# Preface

This document is not a contract deliverable. As such, it does not require formal Government acceptance. Contractor approved changes to this document are handled in accordance with change control requirements described in the ECS Configuration Management Plan. Changes to this document are made by Document Change Notice (DCN) or by complete revision.

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# Abstract

The reference guide for the documents generated on the ECS Project is an overview description of the documents generated for the ECS Project and their relationship to the ECS project. This document provides a context for the documents identified in the on-line master list of documents accessed via the Internet and identified in the Contract Data Requirements document for the ECS project. A basic description of each document is also provided to give the reader an idea of how the documents came to be generated and what the relationship is between the documents and the project.

Detailed information in this document is the level of information derived from requirement sources and used by the development team to complete this reference guide.

***Keywords:*** Reference Guide, Parent Document, Segment, Overview, Interface Control Document, Interface Requirements Document, Requirements, Design, Subsystem, Architecture, Context, Acceptance Plans, Transition Plans, Data Models, Releases, Versions, Process Management, Custom Software and Hardware.

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## Abbreviations and Acronyms

# 1. Introduction

## 1.1 Purpose and Scope

The purpose of this Reference Guide for Documents Generated on the ECS Project (also known as the Parent Document) is to provide an overview of the documents generated for the ECS Project and the relationship between the documents and project activities. This document describes the known documents identified for the ECS Project by Earth Science Data and Information System (ESDIS) and the ECS Project management. This document portrays the ECS Project from the many perspectives (e.g., mission, requirements, operations, data bases, security, process management, transitions and training) describing a project developed to support a broad mission identified by the National Aeronautics and Space Administration.

**Notes:**

1. Any references made about the Flight Operations Segment (FOS) are obsolete. The reader may refer to documents and notes about the ECS Mission Operations Segment (EMOS) instead or substitute EMOS in place of FOS in any text throughout this document.
2. Any references made to Release A in the documents are obsolete. The Release A was not deployed and the many of the requirements and functions were captured within the Release B of the ECS. The Release B would contain most but not all of the functionality required for Release A.

## 1.2 Organization

The remainder of this document is organized as follows:

- Section 2: ECS Project Framework (including Mission Overview, System External Interface Control Documents, and System Interface Requirements Documents)
- Section 3: ECS Project Descriptions and Protection (including System Releases, System Design, System Specification, and System Security)
- Section 4: ECS Project Configurations, Acceptance, Models and COTS (including System Configurations, System Acceptance, System Data Models, System Commercial Off The Shelf (COTS) products)
- Section 5: ECS Project Management, Operations and Training (including System Process Management, System Transition Plans, System Operations Support and System Training)
- Section 6: ECS Project System Support (including Toolkit and Toolkit White Papers, White Papers and Operational Support Software tools)
- Abbreviations and Acronyms

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# 2. ECS Project Framework

## 2.1 Mission Overview

The Mission of the National Aeronautics and Space Administration's Earth Science Enterprise is to develop a scientific understanding of the total Earth System and its response to natural or human-induced changes to the global environment to enable improved prediction capability for climate, weather and natural hazards. The vantage point of space provides information about Earth's land, atmosphere, ice, oceans and biota that is obtained in no other way. Programs of the enterprise study the interactions among these components to advance the new discipline of Earth System Science, with a near-term emphasis on global climate change. Earth Science is science in the national interest and NASA is pleased to play a leadership role in exploring our home planet. The research results contribute to the development of sound environmental policy and economic investment decisions.

The Earth Observing System Data and Information System (EOSDIS) Core System (ECS) has been designated as the ground system to collect, archive, produce higher-level data products and distribute data for the Earth System Science mission. The following documents define the framework for the ground system developed for the ECS Project.

Figure 2-1 is the mission overview, external systems interfaces and requirements and the system specifications for the ECS. This diagram shows the system specifications, verification database and tickets used to develop the ECS. The diagram also shows the interface control and interface requirement documents developed to interact with the ECS. The verification database and tickets are described in individual sub-sections. Each of the interface control and interface requirement documents is identified with a brief identification, purpose and scope. These documents can be found at the http://edhs1.gsfc.nasa.gov/waisdata/catalog/esdiscat.html web site and the http://edhs1.gsfc.nasa.gov/waisdata/catalog/descat.html web site.

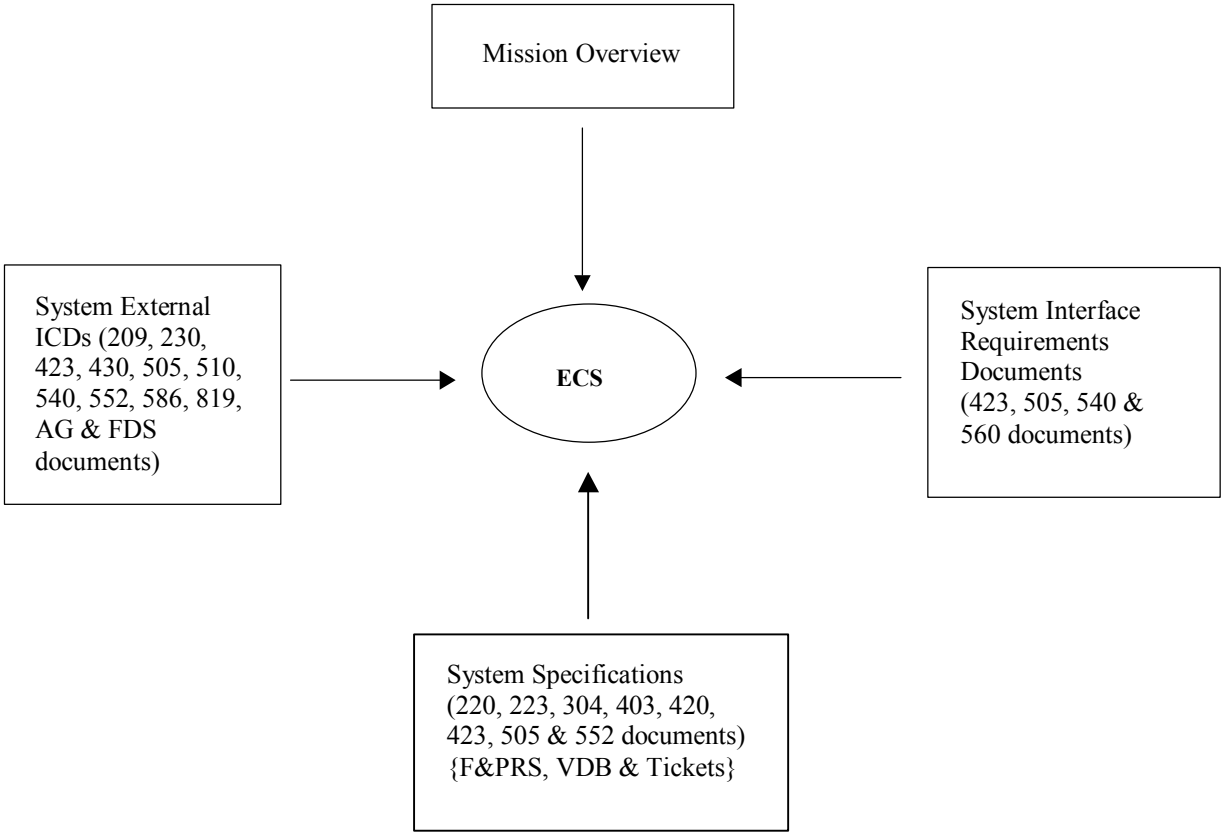


***Figure 2-1. Mission Overview: System Specification & External Interfaces/Requirements***

## 2.2 System Specifications

- **Project Implementation Plan (PIP) Volume II - GDS: Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) and ESDIS and EOS-AM Projects [Document Number 505-10-11]**

Volume II of this Project Implementation Plan (PIP) extends the agreements between the Ministry of International Trade and Industry (MITI) of the Japanese government and the National Aeronautics and Space Administration (NASA) of the United States (U.S.) government to matters regarding the on-orbit operation and ground data processing of the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument on the Earth Observing System (EOS) AM1 spacecraft. As is the case for Volume I, the terms and conditions stated in Volume II are intended to more fully define the implementation requirements and responsibilities specified in the Implementing Arrangement (Memorandum of Understanding, MOU) between the two parties. Consequently, this volume of the PIP addresses system

interfaces and data flows between NASA's EOS Data and Information System (EOSDIS) and the MITI's ASTER Ground Data System (GDS).

This volume of the PIP will enter into force upon signature by all parties and will remain in effect until its termination, or until the termination of Volume I, by mutual agreement in accordance with provisions in the MOU and in the PIP.

In this PIP Vol. II, MITI assumes all the responsibilities of the Japanese side. The Earth Remote Sensing Data Analysis Center (ERSDAC) shall perform actual tasks under the contract with MITI. The ASTER GDS Project at ERSDAC is the implementing organization within ERSDAC that has been specifically designated by MITI to execute these tasks.

For the purpose of this document, "both parties" refers to the Japanese side (represented by MITI) and the U.S. side (represented by the GSFC EOS AM and Earth Science Data and Information System (ESDIS) Projects).

This volume establishes the agreements and the respective and joint responsibilities of these agreements for the planning and implementation of on-orbit activation, flight operations, and GDS operations of the ASTER instrument on the EOS-AM1 spacecraft.

This PIP adds definition to the framework established in the ASTER MOU for NASA and MITI cooperation on the ASTER GDS. The PIP is intended to define mutual responsibilities for ASTER GDS interfaces, data flows, and technical information exchange. Specifically, this PIP addresses the ASTER data system elements comprehensively. Thus, the PIP Volume II includes consideration of ASTER mission operations, including planning and scheduling, and data transmission, handling and processing of the following data types: scientific, command and control, health and safety and other engineering data relevant to ASTER operations and data processing. This volume also describes the Information Management System (IMS) interfaces related to the ASTER data system including user data acquisition requests, product requests, and the exchange of metadata and browse data for all standard ASTER data products.

This document emphasizes the technical implementation of agreements established in the ASTER MOU. Consequently, this volume of the PIP does not define further the matters concerning financial arrangements, release of information to the public, or liabilities of the parties in agreement. Statements in the MOU are considered sufficient for clarifying these matters.

- **System Interface Control Plan for the ESDIS Project [Document Number 505-10-20]**

The Earth Science Data and Information System (ESDIS) Project is responsible for

- Managing the design, development, and operation of the Earth Observing System (EOS) Data and Information System (EOSDIS)
- Definition and operation of the National Aeronautics and Space Administration (NASA) institutional support for EOS missions
- Coordination of domestic and international participating programs with the EOS mission.

ESDIS is a project organization of the Goddard Space Flight Center (GSFC), which is leading the implementation effort for EOSDIS and coordinating the other support activities. The management team for EOSDIS includes project staff at GSFC and personnel at Distributed Active Archive Centers (DAACs). See the ESDIS Project Plan (Reference 1 in Section 1.2) for a description of ESDIS and its objectives, scope, and organization.

This System Interface Control Plan (SICP) provides the methodology for facilitating the definition and development of interfaces for the transfer of data and operations information among these activities. The ESDIS Project has established the Interface Control Working Group (ICWG) to accomplish the principal work of administering this SICP.

The titles of the interface documents under ESDIS authority are listed at the ESDIS Interface Engineering web site at http://esdis-ccr.gsfc.nasa.gov/htbin/cm/icwgdocs.cgi.

These documents are discussed and reviewed by the ICWG, and most of them are approved there. A few documents require the approval of the ESDIS Project and another affected Project. For example, the *Mission Specific Requirements Document (MSRD) for the Landsat Project* is approved by both the ESDIS Level 2 Configuration Control Board (CCB) and the Earth Science Mission Operations (ESMO) Project.

- **ESDIS-NSI Inter-Project Agreement [Document Number 505-10-31]**

This document describes the Inter-Project Agreement (IPA) between the Earth Science Data and Information System (ESDIS) Project Office, and the NASA Science Internet (NSI) - Earth Observing System (EOS) Networking Project in support of the EOS Data and Information System (EOSDIS) External Network requirements. The ESDIS project office is located at NASA Goddard Space Flight Center, and the NSI-EOS Networking Project (referred to as NSI throughout this document) is located at NASA Ames Research Center.

This is version 2 of this IPA. As a result of reassignment of network functions within EOSDIS, it has been decided to put the description of the services NSI will provide for EOSDIS in the NSI Interface Requirements Documents -- only an overview will be contained in this document.

The Earth Observing System (EOS) Project consists of several missions to be launched in the 1998 to 2012 time frame. Each mission includes one or more scientific instruments observing the earth. The EOS project-funded scientific investigators include a total of about 600 scientists at over 150 sites around the world.

The EOS Data and Information System (EOSDIS) consists of the data systems, archives, processing facilities, user support systems, and networking facilities needed to provide a 15-year continuous information base of the entire Earth system from EOS and affiliated data sources.

Data from EOS instruments are sent to one or more of the EOS Distributed Active Archive Center (DAAC) sites in the U.S., where the data are processed, stored, and made available to the scientific community. The EOSDIS Core System (ECS) includes these DAACs and related facilities. The data will be made available to the project-supported scientists and the broader community through the DAACs, both electronically and via media distribution. Electronic access will be provided primarily over the NSI and the general Internet.

- **Earth Science Data and Information System (ESDIS) Project Level 2 to Level 3 Traceability Index [Document Number 505-32-02]**

**No document available on the web site.**

- **Functional and Performance Requirements Specification [Document Number 423-41-02]**

The Functional and Performance Requirements Specification (F&PRS) is the primary document from which all other project documents were produced. The F&PRS provided the direct requirements to produce the external Interface Control Documents (ICDs) and Interface Requirements documents developed for the ECS Project by the Goddard Space Flight Center (GSFC) and its prime contractor.

The Earth Observing System Data and Information System (EOSDIS) is the National Aeronautics and Space Administration's (NASA) overall earth science discipline data system. It provides the ground system for the collection and analysis of science data to support scientists in resolving the dynamics of the Earth's components and the processes by which they interact. As part of the Earth Observing System (EOS) program, EOSDIS supports planning, scheduling and control of the EOS series of spacecraft. EOSDIS exchanges commands, data, and algorithms with the European Space Agency (ESA), Japan, Canada, the National Oceanic and Atmospheric Administration (NOAA). EOSDIS also exchanges commands data, and algorithms with any other non-NASA entities involved in the overall EOS mission. EOSDIS coordinates the activities with other data gathering systems. Finally, EOSDIS transforms the observations into physical variables, providing for higher levels of processing and presenting data to users in forms that facilitate and stimulate interactive scientific research.

The EOSDIS Core System (ECS) is based upon the functional and performance capabilities required by the baseline EOSDIS design (i.e., the acquisition, processing, storage and distribution of the data acquired by the EOS spacecraft.). ECS incorporates selected non-EOS data sets, specifically data sets produced by sources other than EOS instruments that complement data from EOS instruments in supporting NASA's Earth science research program. The ECS provides a comprehensive data and information management system.

The ECS shall provide a full support as defined in this document for the EOS series spacecraft and its complement of instruments. The ECS shall be expandable to include full support for NASA EOS program instruments flown aboard NASA and ESA spacecraft as part of the overall international Mission to Planet Earth effort.

This specification contains the functional and performance requirements of the ECS. The ECS is an evolutionary development. This specification is the baseline from which the ECS will evolve.

- **Performance Assurance Requirements [Document Number 420-05-03]**

This Performance Assurance Requirements (PAR) document is an adaptation of the applicable requirements of the National Aeronautics and Space Administration (NASA) Reliability and Quality Assurance Handbooks NHB 5300.4 (1A and 1B), and the Standard Payload Assurance Requirements (SPAR) for Goddard Space Flight Center (GSFC) Orbital Projects. It establishes

common hardware and software product assurance requirements in the areas of safety, reliability, maintainability, and quality for the design, development, acquisition, test and operation of the EOS Data and Information System (EOSDIS) Core System (ECS). These requirements are compatible with those of the Functional and Performance Requirements Specification for the EOSDIS Core System (ECS F&P Specification) and the ECS Statement of Work (see Appendix A).

These assurance requirements recognize the selected design approach of integrating existing commercial off-the-shelf (COTS) hardware into a system design that may include custom hardware designs. This hardware, when used with a combination of existing and custom developed software and some COTS software, is intended to provide the necessary functional availability and system safety to perform satisfactorily the ECS ground command and data handling functions for the EOS mission.

This PAR document covers: (a) the design, development, integration and test of the ECS, (b) the maintenance and operation of the ECS and the Platform Analysis System (PAS) and Platform Test and Training System (PTTS), and (c) ECS external interfaces, including the support of all systems level tests of the ECS with the EOSDIS and higher level systems testing.

The development approach chosen for EOSDIS is planned to be accomplished step-wise in a series of incremental developments, called "versions," which develop first an operating capability for the basic functions of EOSDIS, and then successively add and integrate the related supplemental capabilities for one additional set of functions after another until the full operational capability of EOSDIS is developed and validated. The scope of each of these versions (Version 0, 1, 2, and 3) and two "enhanced" updates is defined broadly in the SOW for the ECS contract. The corresponding increments of ECS development are called "releases". Releases 1 through 7 correspond to the ECS portion of the six whole and partial EOSDIS "versions". Release 2 is an extension from the Release 1 design; Release 3 is a similar development extended from Release 2, and so forth.

This PAR will treat each release cycle of ECS as a separate (but interrelated) development program (based on its portion of the overall ECS requirements), starting with the Preliminary Design Review for the release and ending with formal acceptance of the release after the Project's Release Readiness Review (RRR) for that release and its integration into the operational ECS.

- **Earth Science Data and Information System (ESDIS) Project Level-2 Requirements Volume 0: Overall EOS Ground System (EGS) Requirements [Document number 423-10-01-0]**

The requirements in this multi-volume document pertain to the Earth Observing System (EOS) Data and Information System (EOSDIS) and all its interfaces. EOSDIS serves several major roles within NASA's Earth Science Enterprise: 1) EOSDIS serves as NASA's Earth Science discipline data system for information management, archival, and distribution of NASA Earth Science data; 2) EOSDIS serves as NASA's portion of the evolving Global Change Data and Information System (GCDIS); and 3) EOSDIS provides the majority of functionality of the ground system supporting the EOS series of spacecraft. In support of these roles, EOSDIS has

interfaces to currently existing and future ground systems for flights concerned with Earth sciences data, institutional support services managed by NASA, systems from other U.S. Government agencies and private organizations, ground systems provided by the International Partners, multiple EOS spacecraft, and user facilities. The organization responsible for implementing EOSDIS is the Earth Science Data and Information System (ESDIS) Project (ESDISP). The requirements in this multi-volume document represent the comprehensive set of requirements to be implemented by the ESDIS Project.

This volume of the document is the first of seven. This volume provides the necessary context for the EOSDIS, and is to be considered as a companion volume to all other volumes. Each of the other volumes is incomplete without Volume 0. Unless specifically stated, the requirements contained in this volume are applicable to all aspects of the data and information system addressed in the other six volumes. Volumes 1 through 3 and 5 through 7 pertain to distinct functional components comprising the EOSDIS. Volume 4 does not exist. Volume 4 is reserved for ESDIS Project Level 2 Requirements for NASA's institutional support services. Figure 1-1 graphically represents these components and all of EOSDIS' interfaces. It is annotated to show which volume of this document contains the requirements for a given component or interface.

This section identifies the requirements' hierarchy and document traceability that applies to the EOSDIS.

a. Earth Observing System (EOS) Program Plan, Document #: 420-01-01, Revision A, Latest Version.

b. Earth Science Data and Information System (ESDIS) Project Plan, Document #: 423-10-02, Latest Version.

c. Mission Requirements Request (MRR) for the AM-1 Flight of the Earth Observing System (EOS), November 1992.

d. EOS AM-1 Detailed Mission Requirements, Document # 505-10-33, see latest version.

e. Mission Requirements Request (MRR) for the PM-1 Flight of the Earth Observing System (EOS), July 1993.

- **ESDIS Project Level-2 Requirements Volume 1: EOSDIS Core System (ECS) [Document Number 423-10-01-1]**

This is a companion document to the Earth Science Data and Information System (ESDIS) Project Level 2 Requirements Volume 0: Overall EOS Ground System (EGS). This document presents the requirements for the EOSDIS Core System (ECS). Volume 0 should be used to understand the Earth Science Enterprise (ESE), the context of ECS and the requirements hierarchy. Requirements effecting ECS but controlled by the Earth Science Data and Information System (ESDIS) Project, such as mission baseline and instrument complement, can be found in Volume 0 and will be referenced but not repeated here.

The ECS will inter-operate with other EOSDIS components and external interfaces such as the Science Computing Facilities (SCFs), EDOS, ERPS, EOS Mission Support network (EMSn), Level 1 Product Generation System (LPGS) for Landsat 7, Spacecraft Ground support, Science

Investigation support, Data Centers, ETS, User Support, IV&V Support, the International Ground System (IGS) and the Global Change Data and Information System (GCDIS). Discussions of these systems can be found in the companion documents.

- **ESDIS Project Level-2 Requirements Volume 2: EOS Data and Operations System Requirements [Document Number 423-10-01-2]**

The Earth Observing System (EOS) is central to the Earth Science Enterprise (ESE), NASA's contribution to the Global Change Research Program. The EOS consists of three main components: the EOS Scientific Research Program (EOSSRP), the Earth Observing System Data and Information System (EOSDIS) and the EOS Space Measurement System (EOSSMS).

This document provides consolidated high-level requirements for the Level 0 data operations in support of the EOS. They are expressed in terms of an EOS Data and Operations System (EDOS) and EOS Real-time Processing System (ERPS) even though the implementation could be through more than one contract. This document is a companion to the Earth Science Data and Information System (ESDIS) Project Level 2 Requirements Volume 0: Overall EOS Ground System (EGS) (to be referred as "Level 2 Volume 0"). Level 2 Volume 0 provides necessary information for understanding the Earth Science Enterprise (ESE), the context of the EDOS/ERPS, and the requirements hierarchy, requirements affecting EDOS, such as those pertaining to the mission baseline and instrument complement, can be found in ESDIS Project Level 2 Volume 0 and will be referenced but not repeated here.

As a goal, EDOS will minimize development and lifecycle costs.

- **ESDIS Project Level-2 Requirements Volume 3: Other ESDIS Project Requirements [Document Number 423-10-01-3]**

This document presents the Level 2 requirements for the Earth Observing System (EOS) Data and Information System (EOSDIS) Test System (ETS). This document is a companion to the Earth Science Data and Information System (ESDIS) Project Level 2 Requirements Volume 0, Overall EOS Ground System (EGS) to be referred as "Level 2 Volume 0". Level 2 Volume 0 provides necessary information for understanding the Earth Science Enterprise (ESE), the context of the ETS, and requirements hierarchy.

- **ESDIS Project Level-2 Requirements Volume 5: EOSDIS Version-0 [Document Number 423-10-01-5]**

This document is the fifth of seven volumes. It describes the overall system requirements for EOSDIS Version 0 (V0) system elements. These requirements have been developed by analyzing the V0 Implementation Plan (Reference 1), the EOSDIS Level 3 Requirements (Reference 2), the Early-EOSDIS Program Plan (Reference 3), and the V0 success criteria contained in the white paper entitled "Version 0 EOSDIS - An Overview" (Reference 4). This set of baseline requirements will be used for designing, implementing, verifying and operating the V0 system. This document does not cover science data priorities being addressed during V0. That information can be found in the companion to this document, the Science Data Plan (Reference 5). The concepts and terminology used in conjunction with V0 are consistent with the Functional and Performance Requirements (F&PR) Specification for the EOSDIS Core

System (ECS) (Reference 6). The Glossary of the ECS F&PR is referenced for this document. This volume, in conjunction with Volume 0, provides the complete set of Earth Science Data and Information System (ESDIS) Project Level 2 requirements for the Version 0 system.

- **ESDIS Project Level-2 Requirements Volume 6: EOS Mission Support network (EMSn) Requirements [Document Number 505-10-01-6]**

This document presents the Level 2 requirements for the EOS Mission Support network (EMSn). The services of the EMSn were previously provided by the Earth Observing System Data and Information System (EOSDIS) Backbone Network (EBnet) system. This document is a companion to the Earth Science Data and Information System (ESDIS) Project Level 2 requirements volume 0: Overall EOS Ground System (EGS), Reference 2. Reference 2 provides necessary information for understanding the Earth Science Enterprise (ESE), the context of the EMSn, and the requirements hierarchy. Requirements affecting EMSn, such as those pertaining to the mission baseline and instrument complement can be found in Reference 1 and will be referenced but not repeated here.

The EMSn provides wide-area communications circuits and facilities between and among various EOS Ground System (EGS) elements to support mission operations and to transport mission data between EOSDIS elements. EMSn is responsible for transporting spacecraft command, control, and science data nationwide on a continuous basis, 24 hours a day, 7 days a week. Real-time data includes mission-critical data related to the health and safety of on-orbit space systems and raw science telemetry as well as prelaunch testing and launch support. Science data includes information collected from spacecraft instruments and various levels of processed science data including expedited data sets, production data sets, and rate-buffered science data.

In addition to providing the wide-area communications through common carrier circuits for internal EOSDIS communications, EMSN serves as the interface to other systems such as Distributed Active Archive Centers (DAACs), users, and the National Aeronautics Space Administration (NASA) EOS Science Support network (ESSn). EMSn also includes a campus interface, which provide communications between the Wide Area Network (WAN) and Local Area Network (LAN).

Key functional objectives of EMSn are:

- Transport - EMSn must provide means to transport spacecraft forward and return data between the EOSDIS Core System (ECS), EOS Real-time Processing System (ERPS) and EDOS and to transport science data between DAACs.
- Network Management - EMSn must enable and assure on a system-wide basis the management of system resources and system operations.

The NASA Integrated Services Network (NISN) project is ultimately responsible for EMSn operations, maintenance and sustaining engineering support.

- **Baseline, ESDIS Project Level-2 Requirements Volume 7: EOS Polar Ground Station Project System Requirements [Document Number 423-10-01-7]**

This document establishes the Level 2 Earth Observing System (EOS) Data and Information System (EOSDIS) requirements for the Ground Network (GN) Polar Ground Stations (PGS) Project support of the Earth Science Enterprise (ESE) missions. Missions supported by the PGS include EOS spacecraft (Terra, Aqua, ICESat, Aura), and other assigned spacecraft (Landsat-7 L7, and EO-1) and others. This document is a companion to the Earth Science Data and Information System (ESDIS) Project Level 2 Requirements Volume 0: Overall EOS Ground System (EGS), Reference 1. Reference 1 provides necessary information for understanding the Earth Science Enterprise, the context of the PGS and the requirements hierarchy. Requirements affecting PGS, such as those pertaining to the mission baseline and instrument complement, can be found in Reference 1 and will be referenced but not repeated here.

Only generic PGS requirements are provided in this document. The requirements that are specific to the individual missions are specified in Appendix D of Reference 1. S-band telemetry data rates quoted in this document are rounded up to the nearest Kilobits per second (Kbps). Exact data rates are also found in Reference 1.

- **Inter-Project Agreement Between Sea Winds and ESDIS for Science Data Archive and Distribution Support [Document Number 423-10-33]**

The purpose of this document is to define the responsibilities, activities and processes of the SeaWinds Project and the ESDIS Project for the processing, transfer, archive and distribution of SeaWinds data. Specifically, this document will:

2.1 Define the activities to be performed for the transfer of the SeaWinds data products to the EOSDIS.

2.2 Define the activities to be performed for the archiving and distribution of SeaWinds data products within EOSDIS.

2.3 Define the responsibilities of the SeaWinds and ESDIS Projects for SeaWinds data processing and archiving and distribution of SeaWinds data products.

2.4 Define the process for establishing and updating the implementation schedule.

2.5 Define the funding responsibilities for each element.

2.6 Define responsibilities for status reporting, coordination activities, and managing change during both implementation and operations phases.

In accordance with Mission to Planet Earth Level 1 requirements, the ESDIS Project has joint responsibility with flight projects for documenting agreements for providing the archiving and distribution of data products from those flight projects serviced by the EOSDIS.

The Inter-Project Agreement (IPA) between ESDIS and the SeaWinds Project defines the responsibilities that support the transfer of the SeaWinds data products to EOSDIS and the

archiving and distribution of SeaWinds data products to the Earth science community. This IPA describes the allocation of these responsibilities between the ESDIS and the SeaWinds Projects.

- **ESDIS Project Mission Specific Requirements for the Landsat-7 Mission Level-1 Processing [Document Number 423-10-36]**

Current ESDIS support for the Landsat 7 Mission is provided by ECS functionality resident at the EDC DAAC, and includes archival and distribution of Landsat 7 Enhanced Thematic Mapper Plus (ETM+) Level 0R (L0R) data including ingest, archival, search and order, billing and accounting, product distribution, and user services for Landsat 7 L0R products. Figure 1-1 depicts the Landsat 7 data flow through the EGS. The ESDIS Project has received funding and direction to add production Level 1 data processing capabilities to the Landsat 7 Ground System. A new system, the Landsat 7 Level 1 Product Generation System (LPGS) is being developed to satisfy this requirement. Certain level 1 processing requirements involving user interfaces and product ordering, distribution, and billing will continue to be performed by ECS functionality resident at the EDC DAAC. This document presents the requirements for Landsat 7 Level 1 processing, to insure that ESDIS support meets the needs of the Landsat 7 Project and that the EOSDIS works as an effective part of the Landsat 7 Ground System. The ESDIS Project has responsibility for development and maintenance of this mission specific requirements document.

- **Inter-Project Agreement Between SAGE III and ESDIS for Science Data Processing, Archive and Distribution [Document Number 423-10-37]**

The Stratospheric Aerosol and Gas Experiment III is an approved extension of the Stratospheric Aerosol Measurement II (SAM II), SAGE I, and SAGE II experiments to improve the aerosol characterization, improve and add to gaseous retrievals and extend the vertical range of measurements and sampling coverage of the heritage instruments. SAGE III is built and its data are processed by the SAGE III Project of the Aerosol Research Branch Atmospheric Sciences Division at NASA Langley Research Center. The first SAGE III will fly on the Russian Space Agency Meteor-3M spacecraft.

The Earth Science Data and Information System (ESDIS) Project is responsible for the development, management and operation of the Earth Observing System Data and Information System (EOSDIS). EOSDIS will archive and distribute data products from instruments on-board Earth observing satellites, such as SAGE III on Meteor-3M.

In accordance with Mission to Planet Earth Level 1 requirements, the ESDIS Project has joint responsibility with flight projects for documenting agreements for providing the archiving and distribution of data products from those flight projects serviced by the EOSDIS.

This Inter-Project Agreement (IPA) between ESDIS and the SAGE III Project defines the responsibilities that support the transfer of the SAGE III data products to EOSDIS and the archiving and distribution of SAGE III data products to the SAGE III Science Team, the general Earth science community and other data users. This IPA describes the allocation of these responsibilities between the ESDIS and the SAGE III Projects.

- **Data Production Software and Science Computing Facility (SCF) Standards and Guidelines [Document Number 423-16-01]**

The purpose of these standards is, fundamentally, to avoid excess costs over the life cycle of the Data Production Software. The standards contained in this document are motivated by a need for maintainable and portable software.

The standards promulgated in this document apply to networked Science Computing Facilities (SCFs) and data production software to be delivered for integration into the Data Processing Subsystem of the Earth Observing System (EOS) Core System (ECS) at the Distributed Active Archive Centers (DAACs). The scope of these standards explicitly excludes prototype code or supporting software that can be used in building Data Production Software but that will not be delivered to the DAAC.

The standards in this document are mandatory. Standards statements always include the word "shall." Guidelines found in this document are not mandatory but are included as recommendations. The guidelines always include the word "should" or "may" in the statement.

- **EOSDIS Core System Statement of Work [Document Number 423-41-01]**

In December 1998 this ECS Statement of Work was significantly revised (Revision B) to reflect NASA programmatic and budgetary changes. Work described in this revision of the SOW reflects work to be performed henceforth.

"(Completed)" next to a section or specific paragraph indicates that no further effort is required as of Revision B of this SOW.

The National Aeronautics and Space Administration (NASA) is implementing a data system for the acquisition, processing, storage, and distribution of Earth observation data. This system, known as the Earth Observing System (EOS) Data and Information System (EOSDIS), will be used to support the EOS mission. The EOSDIS will be a geographically distributed system, which will support the operation and management of EOS in-orbit payloads and U.S. observatories and facilitate a wide range of scientific research on the Earth System and the interactions of its components. To do so, EOSDIS will support the acquisition, processing, storage, and distribution of the data acquired by these payloads and observatories. In addition, the EOSDIS will have the capability to perform storage and distribution functions for selected non-EOS data sets, Tropical Rainfall Measuring Mission (TRMM) data, Landsat 7 data, and other flight missions as identified in the Functional & Performance Requirements Specification for the ECS (ECS Specification).

This Statement of Work (SOW) is for the development and initial operation of the EOSDIS Core System (ECS), the major component of the EOSDIS in support of the EOS spacecraft and instruments and non-EOS data identified within this contract. (The term EOSDIS includes items funded by the EOS Program Office at NASA Headquarters. This contract is supported from that funding source and, therefore, is part of the EOSDIS. In this document, the term ECS is used to identify products of this contract while the term EOSDIS is used to identify the ECS plus items which are outside this contract.)

The ECS is described in detail in the Functional and Performance Requirements Specification. This SOW describes the process by which the ECS shall be implemented and operated and describes the Contractor's responsibilities in achieving this goal. It is the intention of the EOS Program and the role of the ECS to enhance scientific productivity, foster interdisciplinary science, and maximize the scientific productivity for each dollar spent on the disciplines supported by the Earth Science Data and Information System (ESDIS) Project.

The purpose of the EOS Program is to provide the science user community with data and the supporting information system necessary to develop a comprehensive understanding of the way the Earth functions as a global system. This includes the interactions of the atmosphere, oceans, cryosphere, and biosphere, particularly as they are manifested in the flow of energy through the Earth system, the cycling of water and chemicals throughout the physical and biological systems. This comprehensive global study of physical, chemical, and biological processes in an integrated context has been termed Earth System Science, and is focused on the development of the capability to accurately predict the evolution of the Earth system on time scales of decades to a century.

The three main components of the EOS Program are:

a. An observing system (the EOS Space Measurement System [EOSSMS]) to acquire essential, global Earth science data on a long-term, sustained basis and in a manner which maximizes the scientific utility of the data and simplifies data analysis

b. An integrated scientific research program (EOSSRP) to investigate processes in the Earth System and improve predictive models

c. A comprehensive data and information system (EOSDIS) to provide the Earth science research community with easy, affordable, and reliable access to the full suite of Earth science data from U.S. and International Partner (IP) spacecraft

The ECS Contractor shall design, develop, implement, test, deliver, operate, document, and maintain the ECS in accordance with this SOW and the ECS Specification. The baseline ECS shall meet the requirements stated in the ECS Specification. When this SOW (including any Applicable Documents) requires an approval by the Government, such approval shall be deemed to be approval by the Contracting Officer (CO) and the Contracting Officer's Technical Representative (COTR).

Starting with Contract Modification 86, the FOS (i.e., EMOS) is developed using the contractor's documented commercial practices including software development, system engineering, configuration management, program management, and quality assurance practices. In the event, the contractor does not have an applicable documented process; the requirements of this statement of work shall apply. The deliverable data associated with FOS (EMOS) shall be provided in accordance with the ECS Contract Data Requirements List (800 series Data Item Descriptions).

- **Communications Requirements for the ECS Project [Document Number 220-CD-001-004]**

This is the Communications Requirements Document for the ECS Project, CDRL item 040, whose requirements are specified in Data Item Description (DID) 220/SE3. DID 220 is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract NAS5-60000, attachment D, revision A.

The purpose of this document is to provide the ESDIS Project Office and the NSI organization with information on data flow estimates to size, specify, provision and budget for, in a timely manner, the necessary Government Furnished Equipment (GFE) common carrier circuits for ECS use. This document provides current estimates and assumptions regarding the data flow volumes for the EBnet and NSI Wide Area Networks (WAN).

This document provides estimates of the DAAC to DAAC, ECS data flows to be transported on the EBnet and the NSI/Internet WAN in support of the TRMM and AM-1 missions including the SWS and the DFA instruments. Specifically, estimates of the (1) 24-hour average logical data flows, transported between ECS sites on the EBnet and (2) output data flows at the NSI/internet interfaces at each DAAC are provided. The effect of subsetting production data (as described in the Technical Paper, "Reducing Inter-DAAC Data Transfer Through Subsetting," dated October 10, 1995) is included in the estimates. However, the effect of data compression is not included. This is because of the potential reduction in data volume by application of compression techniques to the ECS data sets has not yet been fully analyzed or validated. A detail listing of the "raw" 24 hour-average, inter-DAAC traffic flows (resulting from processing and reprocessing) for the years 1997 through 2000, is provided in Appendix A. Current best estimates of the data flows for non-ECS platforms (e.g., V0) are also provided in this document.

The NASA Communications (Nascom) organization is responsible for the design, implementation and maintenance of the EBnet. Consequently, this document does not (1) specify the "burdened" traffic requirements or circuit size requirements for EBnet, (2) provide a topology for the EBnet WAN, since topology will depend on the choice of circuit offerings and the specific plan for migrating from the currentV0 topology to the ECS topology, (3) provide internet connectivity requirements for non-ECS locations, as these are defined and limited by the Earth Science Data and Information System (ESDIS)-NSI Inter-Project Agreement, and (4) provide information on the Local Area Network (LAN) requirements at the ECS DAACs.

This document supersedes the previous edition of DID 220 (220-CD-001-003) dated February 1995.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **Content Description for the ECS External Data Traffic Requirements [Document Number 552-TD-001]**

This is the preliminary draft of the Content and Format description for the ECS External Data Traffic Requirements document, whose requirements are specified in Data Item Description

(DID) 223/SE1. DID 223 is a required deliverable under EOSDIS Core System (ECS) contract NAS5-60000, attachment D, revision A.

The purpose of this document is to provide the ESDIS Project Office and the NSI organization with information on data flow estimates to size, specify, provision and budget for, in a timely manner, the necessary Government Furnished Equipment (GFE) common carrier circuits for ECS use. This document provides current estimates and assumptions regarding the data flow volumes for the EBnet and NSI Wide Area Networks (WAN).

This draft describes the content and format for documenting all data flows to and from ECS, that have to be transported on the EBnet and the NSI/Internet WAN in support of the TRMM and AM-1 missions. Specifically, estimates of the (1) 24-hour average logical data flows, transported to and from all ECS sites on the EBnet and (2) output data flows at the NSI/internet interfaces at each DAAC are provided. Current best estimates of the data flows for non-ECS platforms (e.g., V0) are also provided in this document.

The NASA Communications (Nascom) organization is responsible for the design, implementation and maintenance of the EBnet. Consequently, this document does not (1) specify the "burdened" traffic requirements or circuit size requirements for EBnet, (2) provide a topology for the EBnet WAN, since topology will depend on the existing infrastructure, choice of circuit offerings and the specific plan for migrating from the currentV0 topology to the EBnet topology, (3) provide internet connectivity requirements for non-ECS locations, as these are defined and limited by the Earth Science Data and Information System (ESDIS)-NSI Inter-Project Agreement, and (4) provide information on the Local Area Network (LAN) requirements at the ECS DAACs. The overhead factors for which ECS has partial responsibility (i.e., TCP/IP overhead and scheduling contingency) are provided. These have been coordinated with Nascom.

- **Science and Data Processing Segment (SDPS) Requirements Specification for the ECS Project [Document Number 304-CD-002]**

The Science Data Processing Segment (SDPS) Requirements Specification for the ECS Project, Contract Data Requirements List (CDRL) item 045, whose requirements are specified in Data Item Description (DID) 304/DV1, is a required deliverable under contract NAS5-60000.

This document specifies the functional and performance requirements for the Science Data Processing Segment. It describes the SDPS level 4 requirements, organized by subsystem and by software and hardware configuration item within each subsystem and traces the level 4 requirements to Releases and to the parent Level3 requirements.

The SDPS Requirements Specification defines the SDPS Level 4 requirements for Interim Release 1 (Ir1) and Release A. In addition, the preliminary requirements for Release B and Release C are provided. The Release B and C requirements will be expanded further during the respective preliminary design phases for these releases. Release IR-1 provides support to TRMM early Interface Testing and Science Algorithm I&T. Release A provides support to TRMM Science Operations and TRMM Ground Systems Certification Testing. Release A also provides the functional capabilities needed to support early ESDIS Ground System Testing for the EOS AM-1 and Landsat 7 missions. Release B provides support to EOS AM-1 Mission Operations and EOS AM-1 and Landsat 7 missions. Release B also provides archive and distribution

services for the Landsat 7 and COLOR missions, and it provides product generation support for COLOR. Release C provides evolutionary enhancements to the ECS services provided in the earlier Releases.

- **Communications and System Management Segment (CSMS) Requirements Specification for the ECS Project [Document Number 304-CD-003]**

This CSMS Requirements Specification defines the CSMS Level 4 requirements for Interim Release 1 (IR-1) and Release A.

These requirements were derived from the Level 3 requirements, as defined in the ECS Functional and Performance Requirements, that map to the functional capability and services defined in the Release Plan Content Description White Paper, FB9403V4. Traceability to these Level 3 requirements will be denoted in Appendix A, Level 4 Traceability Matrix.

This document reflects the technical Baseline submitted via contract correspondence number ECS 194-00343.

- **Release B System Requirements Specification for the ECS Project [Document Number 304-CD-005]**

The Release B System Requirements Specification for the ECS Project, Contract Data Requirements List (CDRL) item 045, whose requirements are specified in Data Item Description (DID) 304/DV1, is a required deliverable under contract NAS5-60000.

This issue of the document has been made necessary by the disapproval of the previous issue (304-CD-005-001) by NASA as communicated to ECS on January 22, 1996. ECS subsequently responded to NASA in White Paper 420-WP-007-001. This issue of the document takes into account the responses made in that White Paper and includes modifications made to the requirements incorporated into the RTM MAIN database before March 1st, 1996. Section 4.1 includes a list of CCRs that are outstanding and reflect the remaining actions from the White Paper.

This document specifies the functional and performance requirements for the Science Data Processing and Communication and System Management Segments for Releases Ir1, A and B of ECS. It describes the Level 4 requirements, organized by subsystem and traces them to the parent Level 3 requirements. Full text of both the Level 4 and the parent Requirements by Release (RbRs) is given to facilitate analysis of coverage and traceability issues. Appendix B provides the downward traceability from the RbRs to the Level 4 requirements. Full text is also provided in that appendix.

The Release B Segment Requirements Specification defines the SDPS and CSMS Level 4 requirements for Releases Ir1, A and B. Although a complete set of Release C requirements is not yet available, Release C L4 requirements are included in Appendix J for the sake of completeness of representation of the requirements database.

Release IR-1 provided support to TRMM Early Interface Testing and Science Algorithm I&T. Release A provides support to TRMM Science Operations and TRMM Ground Systems Certification Testing. Release A also provides the functional capabilities needed to support early

ESDIS Ground System Testing for the EOS AM-1 and Landsat 7 missions. Release B provides support to EOS AM-1 Mission Operations and Science Operations and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B also provides services for the Landsat 7, ADEOS, SAGE III, ALT RADAR, DAO, ERS, JERS, RADARSAT and COLOR missions. Releases C and D will provide evolutionary enhancements to the ECS services provided in the earlier releases. The Release C and D requirements will be expanded further during the respective preliminary deign phases for these releases.

This document has been generated from the Requirements & Traceability Management (RTM) tool and as such represents a snapshot of the database from which it was generated (i.e., RELB_CDR_030196. Section 4.1 presents details of the approach taken for the migration of requirements between ECS releases and the corresponding representation in the RTM database.

This document reflects the February 1996 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **ECS External Data Traffic Requirements [Document Number 223-CD-001]**

This is the fourth release of the ECS External Data Traffic Requirements document, whose requirements are specified in Data Item Description (DID) 223/SE1. DID 223 is a required deliverable under EOSDIS Core System (ECS) contract NAS5-60000, attachment D, revision A.

The purpose of this document is to provide the ESDIS Project Office and the NSI organization with information on data flow estimates to size, specify, provision and budget for, in a timely manner, the necessary Government Furnished Equipment (GFE) common carrier circuits for use in ECS. This document provides current estimates and assumptions regarding the data flow volumes for the EBnet and NSI Wide Area Networks (WAN).

This document describes all data flows to and from ECS, that are to be transported on the EBnet and the NSI/Internet Wide Area Networks in support of the AM-1, CHEM-1, Landsat 7 and PM-1 missions through the year 2002. Data flows from missions beyond the year 2002 are not included herein. Data flows for ADEOS II and RADAR ALT (JASON) are non-ECS and therefore not in this document. The AHWGP scenarios describe the processing of data from the AM-1 and Landsat 7 missions. The resulting DAAC to DAAC data flows include processing, reprocessing and dependency flows based on the subsetting of data products assumed by the AHWGP. Additional flows may result from processing of data from later missions, but information on such processing is not yet available. Additionally, the document identifies those flows between ECS and other associated/affiliated systems. Specifically, estimates of the (1) 24-hour average logical data flows, transported to and from all ECS sites on the EBnet and (2) output data flows on the NSI/internet interfaces at each DAAC are provided.

The NASA Communications (Nascom) organization is responsible for the design, implementation and maintenance of the EBnet. Consequently, this document does not (1) specify the "burdened" traffic requirements or circuit size requirements for EBnet, (2) provide a topology for the EBnet WAN, since topology will depend on the existing circuit infrastructure, choice of circuit offerings and the specific plan for migrating from the currentV0 topology to the

EBnet topology, (3) provide internet connectivity requirements for non-ECS locations, as these are defined and limited by the Earth Science Data and Information System (ESDIS)-NSI Inter-Project Agreement, and (4) provide information on the Local Area Network (LAN) requirements at the ECS DAACs. The overhead factors for which ECS has partial responsibility (i.e., TCP/IP overhead and scheduling contingency) are provided. These have been coordinated with Nascom.

- **Verification Specification for the ECS Project [Document Number 403-CD-001]**

This document is submitted as required by CDRL item 065 DID 403, whose requirements are specified in this document as a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract (NAS5-60000).

The purpose of the ECS Verification document is to identify the verification methods and assigned tests, both system and acceptance, used to verify each requirement. This document includes a description of the Requirements and Traceability Management (RTM) tool used to trace requirements and matrix tables containing the requirements to be met in IR1 and Release A. These matrix tables include requirement identifiers, requirement text, assignment to requirement categories, identification of the verification methods discussed in greater detail in the ECS Verification Plan (DID 401), the System Integration and Test Plan (SITP) test assignments and the ATP (Acceptance Test Plan, DID 409) test assignments.

This document stipulates the specific portions or functions of the system design requirements to be verified by each of the tests and analyses in both Interim Release 1 and Release A volumes of the ECS SITP and the ECS ATP. It also specifies the verification methods as discussed in the ECS Verification Plan.

- **ECS Verification Database**

EOSDIS Core System (ECS) Verification Database (VDB) is a repository for the ECS configuration controlled requirements as well as test and verification status of the ECS development program. The VDB provides specific reports on the ECS requirements and the test and verification process.

Data is accepted into the VDB only from authorized sources and is tightly controlled. The database is directly accessible only by the database administrators. Reports on this data are generally available from the web site http://ecsv.gsfc.nasa.gov/ecsv_v2/index.html and are the VDB's principal product. These reports have been arranged by category and type. Many reports are available by development release.

Caution: The VDB is the only authorized source for ECS requirement data. Users should always consult the VDB on line to ensure that they have current and accurate requirement data. Data in the VDB is frequently updated and the valid lifetime of a printed report is brief. Printed or downloaded reports must be discarded promptly.

The VDB provides links to other ESDIS Project and EOS-related web sites. A listing of these links is provided in the gray bar on the left of the home page and also the links page, which additionally includes a brief on each of the web sites.

Additional details regarding the VDB's data types are available from the database information page. The user can also email the VDB administrator if there are specific questions that remain unanswered.

The VDB is built and maintained by QSS Group, Inc. for the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) under the Multi-disciplinary Engineering Development Services (MEDS) Contract.

- **Tickets**

Tickets are an ECS development concept that draws together information from various database tables into a single, cohesive description of each ECS Release Capability as identified in the ECS Science System Release Plans. These data sets are created in real-time from numerous VDB tables.

A ticket contains some high-level information, such as ticket id, name, interface dependencies, preconditions and comments, the last of which typically provides detailed descriptions of the ticket's intent. Tickets also include (via database mappings) development capabilities, level 3, level 4 and interface requirements, criteria and test cases. Tickets are uniquely managed in the database inasmuch as the VDB tracks and identifies both changes to the ticket and information mapped to the ticket as part of the ticket itself. Tickets can be viewed at the http://ecsv.gsfc.nasa,gov/ecsv_v2/reports/db_tickets/index.cgi web site for those interested in reviewing ticket information.

## 2.3 External Interface Control Documents

The external interface documents provide the data flows and data formats of message and data traffic (protocol) between the ECS and other external systems to provide the data and services needed by the scientific community from the ECS. The Interface Control Documents (ICDs) can be viewed in their entirety from the GSFC web site http://romulus.gsfc.nasa.gov/docview/docfinder or at the ECS Project

http://edhs1.gsfc.nasa.gov/waisdata/catalog/esdiscat.html web site. The following list is a sampling of brief purposes and scopes of the interface control documents generated between the ECS and other external systems.

- **ICD between ECS and AM-1 FDS [Document Number 552-FDD-96/010R0UD0]**

This interface control document (ICD) defines the complete interface between the Flight Dynamics System (FDS) and the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), in support of the Earth Observing System (EOS) AM-1 mission.

This ICD covers the delivery and receipt of products between the FDS and ECS for prelaunch analysis, training and simulation activities through the launch, early mission, routine operations, and end-of-life activities. The products themselves are separated into attitude and orbit related functions, as described in Reference 1.

This ICD covers all products, analysis and timed events that will occur between the FDS and the EOS Operations Center (EOC). The EOC is responsible for the high-level monitoring and

control of all instruments on-board the EOS AM-1 spacecraft. The EOC, together with the Instrument Support Terminal (IST) toolkits, constitutes the EOS Mission Operations System (EMOS). The EOSDIS is the ground system that provides for all flight operations support and data processing and archiving systems for the EOS missions.

This ICD also covers analysis support and the FDS products provided to the Science Data Processing Segment (SDPS) for the purpose of repairing attitude and orbit data. The SDPS is also a segment of the ECS and is responsible for the processing, product generation, distribution and archival of Level 1 through Level 4 data

- **ICD between ECS and AM-1 SAS [Document Number 505-41-38]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) Item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

This ICD is written to formalize the interpretation and general understanding of the ECS/AM-1 Spacecraft Analysis System interface. This document provides clarification and elaboration of the SAS interface to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control for these interface definitions for the ESDIS and AM Project Configuration Control Boards (CCBs)**.**

This ICD provides definition for the system interfaces that exist between ECS and the EOS-AM Project for the AM-1 Spacecraft Analysis System (SAS).

The Earth Science Data and Information System (ESDIS) Project has joint responsibility with the AM Project for the development and maintenance of this ICD**.** Any changes in the interface definition must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS and AM Project Managers.

ECS Releases are keyed to mission support: Release IR1 provides support to the Tropical Rainfall Measuring Mission (TRMM) Early Interface Testing and Science Algorithm I&T. Release A provides support to TRMM Science Operations and TRMM Ground Systems Certification Testing. Release A also provides the functional capabilities needed to support early ESDIS Ground System Testing for the EOS AM-1 and Landsat 7 missions. Release B provides support to EOS AM-1 Mission Operations and Science Operations, and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B also provides archive and distribution services for the Landsat 7 mission. Releases C & D provide evolutionary enhancements to the ECS services provided in the earlier Releases.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction No. 11, dated December 6, 1994.

- **ICD between ECS and DAS [Document Number 423-41-56]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and the DAS. These interfaces exist in order to allow transfer of DAS product data, associated metadata, and information to ECS for data archive and make possible distribution of DAS products to users directly from ECS. This document includes the requirements for the ECS-DAS interfaces and provides clarification and elaboration of these interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of system interface definitions for the ESDIS and DAO Project Configuration Control Boards (CCBs).

The ECS-DAS ICD provides definition for the system interfaces between the ECS and the DAS system. This ICD does not explicitly define ECS user interfaces. User interfaces with ECS to acquire DAS product data are described herein for informational purposes only.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD with support from the Data Assimilation Office (DAO)**.** Any changes in the interface definition must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This ICD is approved under the signatures of the ESDIS Project Managers and the Head of the DAO.

ECS provides support to ESDIS Science Operations and ESDIS Ground Systems Certification Testing. It provides the functional capabilities needed to provide support to EOS Terra and Aqua Mission Operations and Science Operations, and Landsat 7 and SAGE III missions. It also provides archive and distribution services for the DAS.

For the ECS to DAS interface, this ICD provides definition of control messages supporting data exchange, definition of the data exchange protocol for transferring data files from DAS to ECS, and the DAS-ECS physical communications connection. This ICD also presents the definition of the full ECS-DAS system interfaces which support transfer, ingest, archive and distribution of DAS product data and metadata.

Also included as an appendix are the interface requirements for the DAS interfaces with the ECS as well as a table tracing these requirements to the higher-level requirements in the Functional and Performance Requirements Specification for the ECS. These requirements were formerly published in the Interface Requirements Document between the ECS and DAS.

ECS functionality will be delivered in phased releases or drops. This document does not include ECS release or drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

- **ICD between ECS and EDC [Document Number 423-41-58]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) Item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation of the interface between ECS and the EDC, for the DEM data and for the DORRAN system, to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system. This ICD also provides a control point for the definition of interfaces between ECS and the EDC.

This ICD defines the detailed design of interfaces between ECS and the EDC. These interfaces are for 1) ancillary Digital Elevation Model (DEM) data, and 2) the billing and accounting system at EDC (Distributed Ordering, Research, Reporting and Accounting Network [DORRAN]). These interfaces satisfy the requirements specified in Appendix A of this ICD.

Certain implementation details are not suitable for, or specified in, this document. Such items as contact address, telephone or fax numbers, internet host id's, values for operator tunable parameters such as number of retries on failure or timeouts should be documented in an Operations Agreement or Operations Procedures document under the control of the Distributed Active Archive Center (DAAC). The term "Operations Agreement(s)" in this document refers to such a document though the particular documentation name may vary from DAAC to DAAC.

This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the Science Data Processing System (SDPS) Program Schedule.

- **ICD between ECS and GSFC DAAC [Document Number 505-41-40]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces to transfer ancillary data to ECS from non-ECS components of the GSFC DAAC. This document provides clarification and elaboration of the ECS interfaces with non-ECS systems at the GSFC DAAC to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This Interface Control Document (ICD) defines the external interfaces for transfer of ancillary data to ECS at any Distributed Active Archive Center (DAAC) from the Data Link Server at the Goddard Space Flight Center (GSFC) DAAC. This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

In particular, this ICD describes the following:

a. Internetworking

1. For ECS to Version 0 (V0) and ECS to GDAAC Data Link Server/larry ancillary data transfer (needed to support ECS standard product generation at the GSFC DAAC and/or at other sites)
2. For V0/ECS interoperability [interface addressed in detail in "Interface Control Document between the EOSDIS Core System (ECS) and the Version 0 System for Interoperability"]
3. Between ECS and the GSFC Campus via external networks

b. ECS to GDAAC Data Link Server data flows, specifically, for accessing ancillary data products needed to support ECS standard product generation.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to, and assessed at the ESDIS Project Level. This ICD is approved under the signature of the ESDIS Project Manager.

- **ICD between ECS and LPDS [Document Number 586-1ICD/0398]**

This interface control document (ICD) between the Level 1 Product Distribution System (LPDS) and the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) defines the method the LPDS will use for ordering Level 0R (L0R) products from the ECS and how the LPDS will be notified of the availability of those products. This ICD does not impose any new requirements on the ECS, but documents the existing interface established by the ECS for WRS scenes and the agreements reached for ordering floating scenes.

- **ICD between ECS and LaRC DAAC [Document Number 505-41-39]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and non-ECS components of the Langley DAAC. This document provides clarification and elaboration of the ECS/non-ECS systems interfaces at the Langley DAAC to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions via the ESDIS Configuration Control Board (CCB).

This Interface Control Document (ICD) defines the external interfaces (i.e., between ECS and non-ECS components) within the Langley Research Center (LaRC) Distributed Active Archive Center (DAAC) for Release B. It should be noted that all interfaces presented in this ICD pertain, in their entirety, to Release B. ECS Releases are keyed to mission support: Release IR-1 provides support to TRMM Early Interface Testing and Science Algorithm I&T. Release B testbed also provides the functional capabilities needed to support early ESDIS Ground System Testing for the EOS AM-1 and Landsat 7 missions. Release B provides support to EOS AM-1

Mission Operations and Science Operations, and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B also provides archive and distribution services for the Landsat 7 mission. Releases C & D provide evolutionary enhancements to the ECS services provided in the earlier Releases.
This ICD does not describe the interfaces at the LaRC DAAC in support of the CERES-TRMM mission or the CERES-Terra. These interfaces are outlined in the EOSDIS to TRMM GroundSystem IRD and relevant LaRC TRMM Information System (LaTIS) documentation. The EDOS-LaTIS interface is described in the EDOS-EGS ICD for CERES-Terra.

This document reflects the technical baseline maintained by the ECS Configuration Control Board in accordance with ECS technical direction (see Section 2.2). In particular, this ICD describes the following:

a. Internetworking
    1. for ECS-to-Version 0 (V0) ancillary data transfer (needed to support LaTIS CERES product generation)
    2. for Version 0 (V0)-to-Version 1 (V1) static data migration (involving the transfer of data holdings from the EOSDIS V0 system archives to ECS) [data migration addressed in further detail in "Version 1 Data Migration Plan"]
    3. for V0/ECS interoperability [interface addressed in detail in "Interface Control Document between the EOSDIS Core System (ECS) and the Version 0 System for Interoperability"
    4. between ECS and the Langley Campus via external networks
b. ECS-to-V0 data flows, specifically, for accessing ancillary data products needed to support LaTIS CERES product generation

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to, and assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS Project Manager.

- **ICD between ECS and Landsat 7 System [Document Number 505-41-32]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and the Landsat 7 System. These interfaces exist in order to allow transfer of Landsat 7 Level 0R data, associated data, and information to ECS for data archive and for distribution of Landsat 7 products to users directly from ECS. This document provides clarification and elaboration of the ECS-Landsat 7 interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

The ECS-Landsat 7 ICD provides definition for the system interfaces between ECS and the Landsat 7 System. System interfaces between ECS and LPS support early interface testing as

well as Landsat 7 operations. The ECS to LPS interface will be changed to accommodate a more efficient methodology. The new interface is between ECS and the Landsat 7 Archive Management System (LAMS). This ICD does not explicitly define ECS user interfaces. User interfaces with ECS to acquire Landsat 7 data are described herein for informational purposes only.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD with support from Landsat 7. Any changes in the interface definition must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This ICD is approved under the signatures of the ESDIS and Landsat 7 Project Managers.

This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

This ICD presents the definition of the full ECS Landsat 7 system interfaces, which support:

- transfer, ingest, archive and distribution of Landsat 7 Level 0R data and calibration parameters
- transfer of international ground station (IGS) metadata and browse
- transfer of product price information and system management status
- access to Landsat 7 directory and guide information

This document reflects the technical baseline, maintained by the ECS Configuration Control Board in accordance with the ECS technical direction.

- **ICD between ECS and NOAA ADC [Document Number 505-41-36]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) Item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interface between the ECS and the NOAA. This document provides clarification and elaboration of the ECS-NOAA ADC interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions.

This ICD defines the system interfaces that exist between the ECS and the National Oceanic and Atmospheric Administration (NOAA) Affiliated Data Center (ADC) to support transfer of NOAA data to the ECS. This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule. Also, this document does not include the interface for transfer of NOAA NCEP data to the ECS, which is covered in the ICD between the ECS and the GSFC DAAC.

This document describes the interface for the ECS acquisition of ancillary data from the NOAA National Environmental Satellite, Data, and Information Service (NESDIS); this includes data located at both the Central Environmental Satellite Computer System (CEMSCS) and the National Climatic Data Center (NCDC). In addition, ECS acquires ancillary data from the National Weather Service's (NWS) National Centers for Environmental Prediction (NCEP) via the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC). That interface is described in the ICD between ECS and the GSFC DAAC. However, the full list of ancillary data provided to the ECS by NOAA, formerly published in the Interface Requirements Document between the ECS and NOAA, is included as an appendix in this document.

Also included as an appendix are the set of interface requirements for NOAA's interfaces with the ECS as well as a table tracing these requirements to the higher-level requirements in the Functional and Performance Requirements Specification for the ECS. These requirements were formerly published in the Interface Requirements Document between the ECS and NOAA.

The Earth Science Data and Information System (ESDIS) Project has joint responsibility with NOAA for the development and maintenance of this ICD. Any changes in the interface requirements or design must be agreed to by the relevant participating parties. This ICD will be approved under the signatures of the ESDIS Project Manager and the Director, NOAA NESDIS Office of Satellite Data Processing and Distribution.

- **ICD between ECS and NSI [Document Number 505-41-31]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This ICD defines the unique interfaces between ECS and the NSI as derived from the Level 3 requirements specified in the Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System and the Interface Requirements Document Between EOSDIS Core System (ECS) and the NASA Science Internet (NSI). This document is written to formalize the interpretation and general understanding of the interface between ECS and the NSI. This document also provides clarification and elaboration of the ECS-NSI interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system. This ICD provides a control point for definition of external interfaces between ECS and the NSI.

This ICD defines the system interfaces that exist between ECS and the NSI in the ECS Pre-Release B Testbed and Release B timeframes. Unless otherwise stated, the information in this ICD is applicable to both releases.

The Earth Science Data and Information System (ESDIS) Project has joint responsibility with the NSI project for the development and maintenance of ICD sections that are relevant to the NSI interface. Any changes in the interface definition must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS Project Manager and NSI.

This document reflects the technical baseline maintained by the ECS Configuration Control Board in accordance with ECS technical direction (see Section 2.2).

- **ICD between ECS and NSIDC DAAC [Document Number 423-41-45]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) Item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and non-ECS components of the NSIDC DAAC-Unique System. This document is intended to provide clarification and elaboration of the ECS/non-ECS system interfaces at the NSIDC DAAC to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions between the ECS and the NSIDC DAAC via the ESDIS Configuration Control Board (CCB).

This Interface Control Document (ICD) defines the functional and physical design of those interfaces between ECS and the DAAC-unique system at NSIDC that are needed to ingest products that need to be archived and distributed by ECS or to ingest the required ancillary data products for support of the ECS product generation. This ICD does not explicitly define ECS user interfaces.

This ICD does not address Version 0 catalog interoperability data flows; these are included in the Interface Control Document Between the EOSDIS Core System (ECS) and the Version 0 System.

This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to, and assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS Project Manager.

- **ICD between ECS and SAGE III MOC [Document Number 505-41-47]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) Item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and the SAGE III MOC. It provides ECS/SAGE III MOC interface requirements and clarification and elaboration of the requirements to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions via the ESDIS Configuration Control Board (CCB).

This ICD provides definition for the system interfaces between the ECS at the LaRC DAAC and the SAGE III MOC.

It provides definition of the data exchange framework, definition of the data exchange protocol for transferring low volume data files from the SAGE III MOC to the ECS, the SAGE III MOC-ECS physical communications connection and the metadata, Level 0, definitive orbit and ancillary data definition.

Also included as an appendix are the set of interface requirements for the SAGE III MOC's interfaces with the ECS as well as a table tracing these requirements to the higher-level requirements in the Functional and Performance Requirements Specification for the ECS. These requirements were formerly published in the Interface Requirements Document Between the ECS and the Stratospheric Aerosol and Gas Experiment III.

This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

In its approved version, the Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD with support from the SAGE III Project and Science Team and the Langley DAAC Project. Any changes in the interface definitions will be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This ICD is approved under the signatures of the ESDIS Project Manager, the Langley DAAC Project Manager, the SAGE III PI, and the SAGE III Project Manager.

- **ICD between ECS and SCFs [Document Number 505-41-33]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) Item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This ICD defines the unique external interfaces between the ECS and SCFs as derived from the Level 3 requirements specified in the Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System. This document is written to formalize the interpretation of the external interface between ECS and the SCFs to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system. This ICD also provides a control point for the definition of external interfaces between ECS and the SCFs.

This ICD defines the detailed design of the external interfaces between ECS and the Science Computing Facilities (SCF) that are unique to ECS-SCF interaction. ECS-SCF interfaces satisfy the requirements specified in Appendix B of this ICD. The general user interfaces not covered herein support those capabilities that SCFs share with all other ECS users, such as the conduct of data searches. Interfaces are included herein if they are necessary for the SCF to carry out its role as software developer and provider and for quality assessment of the associated data products.

These SCF interfaces support science data production software development by the scientists at SCFs and data processing and data reprocessing operations at the Distributed Active Archive Centers (DAACs) using SCF-developed science data production software. This ICD specifies "DAAC" for data flows between an SCF and DAAC operations staff and specifies "ECS" for all other data flows. The SCF interfaces include the transfer of science data production software, coefficients and SCF-generated ancillary data, science data product quality information, and information about science data processing and reprocessing. Other interfaces support remote integration and test of SCF-developed science data production software. The interfaces also support software maintenance changes.

Appendix B identifies requirements for all of the interfaces that are unique to the ECS-SCF interaction. Many of these flows are to be implemented between ECS software at the DAACs and ECS supplied software resident at the SCF. From a design perspective these interfaces are internal to ECS because they are between two ECS software items (e.g., client-server interaction where the client is provided by ECS). This ICD describes the details of those remaining external ECS-SCF interfaces that are between ECS or DAAC operations on one side and SCF staff or software that is provided by the SCF on the other side. Throughout this document the term "external interfaces" refers to these latter SCF interfaces.

The instrument planning, scheduling, commanding, and telemetry monitoring interfaces between ECS and the SCFs are not covered in this ICD. Concerning the Instrument Support Toolkit (IST), the IST Capabilities Document for the ECS Project explains the capabilities of the IST and defines the interface between the IST and the SCF workstation hosting the toolkit. The definition of the interface between the IST and the EOSDIS Operations Center (EOC) are in ECS (EMOS) internal requirements and design documents (because the EOC/IST interface is internal to EMOS).

All SCF interfaces usually involve humans at the SCFs interacting with ECS. The SCFs can implement some interfaces by using ECS-provided software, other interfaces by using public domain software, and all remaining interfaces by using commercial off-the-shelf software rather than by coding new software to implement these interfaces. SCFs can optionally automate some interfaces by parsing notice email messages from ECS. Because these interfaces are intended to support interactions with humans, this ICD allows flexibility in the implementation of these interfaces.

Certain implementation details are not suitable for, or specified in, this document. Such items as contact address, telephone or fax numbers, internet host id's, values for operator tunable parameters such as number of retries on failure or timeouts should be documented in an Operations Agreement or Operations Procedures document under the control of the DAAC and with concurrence of the SCF. The term "Operations Agreement(s)" in this document refers to such a document though the particular documentation name may vary from DAAC to DAAC.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the approval and maintenance of this ICD. Any changes in the interface definition must be assessed at the ESDIS Project Level. This ICD is approved under the signature of the ESDIS Project Manager.

This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

- **ICD between ECS and SDVF [Document Number 505-41-37]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

This ICD is written to formalize the interpretation and general understanding of the ECS/SDVF interface. This document provides clarification and elaboration of the ECS/SDVF interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of these interface definitions for the ESDIS Configuration Control Board (CCB) and the CCB(s) serving the AM Project and the Flight Software Systems Branch**.**

This ICD provides definition for the system interfaces that exist between ECS and the Software Development and Validation Facilities (SDVF). For the EOS AM-1 mission, the SDVF function initially is performed by the AM-1 Software Development Facility (SDF), located at the AM-1 spacecraft vendor's facility in Valley Forge, PA. After AM-1 launch, the SDVF function transfers to the Goddard Space Flight Center (GSFC) Flight Software Systems Branch (Code 512) AM-1 Flight Software Test Bed (FSTB), at a time determined by the AM Project. This ICD covers the ECS interfaces to both the AM-1 SDF and the Code 512 FSTB.

This document is intended to define and control the external interfaces between FOS and SDVF software. The FOS Operations Tools Manual provides detailed information on the capabilities and operation of FOS software at the EOC and the IST. This document is not intended to duplicate or supersede the information provided in the FOS Operations Tools Manual.

The Earth Science Data and Information System (ESDIS) Project has joint responsibility with the AM Project and the Flight Software Systems Branch for the development and maintenance of this ICD**.** Any changes in the interface must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This ICD will be approved under the signatures of the ESDIS and the AM Project Managers and the Flight Software Systems Branch Head.

ECS Releases are keyed to mission support: Release B provides support to EOS AM-1 Mission Operations and Science Operations, and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B also provides archive and distribution services for the Landsat 7 mission. Releases C & D provide evolutionary enhancements to the ECS services provided in the earlier Releases.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction No. 11, dated December 6, 1994.

- **ICD between ECS and SIPS, Volume 0 [Document Number 423-41-57]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and the SIPS in general. Taken in conjunction with Volume 9 of this ICD and the SIPS-unique volumes, this document provides clarification and elaboration of those interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document specifies the interface design to implement the ECS requirements documented and controlled in ESDIS document 423-42-03, Interface Responsibilities for Standard Product Generation Using Science Investigator-Led Processing Systems. It includes specifications for data exchange between the ECS DAAC and the Science Investigator-Led Processing System (SIPS) that fall under the following topics:

1. Internetworking
2. Interface mechanisms
3. File naming conventions
4. Handshaking message formats
5. Error handling and fall back procedures
6. Security

Data exchanges addressed include --

a. Transfer of data from ECS to SIPS for standard product generation
b. Transfer of metadata configuration files from ECS to SIPS to support standard product metadata generation
c. Transfer to ECS of SIPS standard products and other files resulting from or associated with SIPS standard product generation

Also addressed are special services to ensure that data granules received from the SIPS are associated with defined collections in the archives.

If authorized, SIPS may also produce EOS special products and use these same mechanisms to pass them to the ECS for archiving and distribution. Instructions for introducing special products are given in the ICD between the ECS and Science Computing Facilities (SCF).

The SIPS may employ the ECS Machine-to-Machine Search and Order Gateway (MTMGW) to search and order data from ECS archives for use in reprocessing by the SIPS. Specifications and instructions for the MTMGW are found in Volume 9 of this ICD, 423-41-57-9.

This document, in conjunction with Volume 9, describes the ECS interfaces and services applicable and available to all SIPS.

For each SIPS, a separate volume documents data types to be transferred and/or archived with data volumes and frequencies as well as unique aspects of the interface between the particular SIPS and the particular interfacing DAAC(s). The SIPS may interact with one or more DAACs using the same ECS services and mechanisms at each DAAC. All interfaces to be implemented between a particular SIPS and ECS are specified in the SIPS-unique volume.

This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to, and assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS Project Manager.

- **ICD between ECS and SIPS, Volume 1 ACRIM III [Document Number 423-41-57-1]**

This volume documents interface configurations and data type specifications agreed to by ACRIM III SIPS and Langley DAAC. SIPS-unique interface changes will be agreed on and documented in this volume prior to implementation.

This volume provides information specific to the interfaces between ECS at the Langley DAAC and the ACRIM III Science Investigator-led Processing System (SIPS). For generally applicable technical specifications and supporting information on the SIPS interfaces, see Volume 0 of this ICD. The ECS and the ACRIM III SIPS are components of the EOSDIS. The interfaces defined are in support of routine EOS Standard Product generation and distribution for the ACRIM III instrument aboard the ACRIMSAT.

Included are:

- Documentation references.
- Context and infrastructure information for the ECS-ACRIM III SIPS interfaces.
- Identification of standing order subscriptions for transfer of Level 0, orbit, attitude, and other ancillary data from ECS to ACRIM III SIPS for routine EOS Standard Data Processing including data product granule size and transfer frequency.
- Identification of EOS Standard Products generated by ACRIM III SIPS along with other products generated or obtained by the ACRIM III SIPS that directly support EOS Standard Products for transfer to ECS for archive and distribution including data product granule size and transfer frequency.
- Identification of ancillary data and associated documentation used as input to the ACRIM III SIPS processing of EOS Standard Data Products.
- Identification of items in the Delivered Algorithm Package for archive in the ECS.

- **ICD between ECS and SIPS, Volume 10, TES Data Flows [Document Number 423-41-57-10]**

This volume provides specific information about the interfaces between the EOSDIS Core System (ECS) at the Langley Research Center (LaRC) Distributed Active Archive Center (DAAC) and the Tropospheric Emission Spectrometer (TES) Science Investigator-led Processing System (SIPS). The ECS and the TES SIPS are components of the EOSDIS. The interfaces defined are in support of routine EOS Standard Product generation and distribution for the TES instrument aboard the NASA EOS Aura spacecraft.

Included are:

- Documentation references.
- Context information for the ECS-TES interfaces.
- Identification of ECS subscriptions for transfer of orbit, attitude, and other ancillary data from ECS to TES for routine EOS Standard Data Processing including data product granule size and transfer frequency.

Identification of EOS Standard Products generated by TES along with other products generated by the TES SIPS that directly support EOS Standard Products for transfer to ECS for archive and distribution, including data product granule sizes, and transfer frequency.

- **ICD between ECS and SIPS, Volume 11, ICESat Data Flows [Document Number 423-41-57-11]**

This volume provides specific information about the interfaces between the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) at the National Snow and Ice Data Center (NSIDC) Distributed Active Archive Center (DAAC) and the Ice, Clouds & Land Elevation Satellite (ICESat) Science Investigator-led Processing System (SIPS), I-SIPS. The ECS and the I-SIPS are components of the EOSDIS. The interfaces defined are in support of routine EOS Standard Product generation and distribution for the Geoscience Laser Altimeter System (GLAS) instrument aboard ICESat.

Included are:

- Documentation references.
- Context information for the ECS / I-SIPS interfaces.
- Discussion of ordering and transferring of Level 0, National Center of Environmental Prediction (NCEP) meteorological data and other ancillary data for routine I-SIPS EOS Standard Data Processing. This information includes data product granule size and transfer frequency.

Identification of EOS Standard Products generated by the I-SIPS and products generated by the I-SIPS that directly support EOS Standard Products that are transferred to ECS for archive and distribution. This information includes data product granule size and transfer frequency.

- **ICD between ECS and SIPS, Volume 12, HIRDLS [Document Number 423-41-57-12]**

This volume provides specific information about the interfaces between the EOSDIS Core System (ECS) at the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC) and the High Resolution Dynamics Limb Sounder (HIRDLS) Science Investigator-led Processing System (SIPS). The ECS and the HIRDLS SIPS are components of the EOSDIS. The interfaces defined are in support of routine EOS Standard Product generation and distribution for the HIRDLS instrument aboard the NASA EOS Aura spacecraft.

Included are:

- Documentation references.
- Context information for the ECS-HIRDLS interfaces.
- Identification of ECS subscriptions for transfer of orbit, attitude, and other ancillary data from ECS to HIRDLS for routine EOS Standard Data Processing including data product granule size and transfer frequency.

Identification of EOS Standard Products generated by HIRDLS along with other products generated by the HIRDLS SIPS that directly support EOS Standard Products for transfer to ECS for archive and distribution, including data product granule sizes, and transfer frequency.

- **ICD between ECS and SIPS, Volume 13, OMI [Document Number 423-41-57-13]**

**Document has not been base-lined.**

- **ICD between ECS and SIPS, Volume 14, SORCE [Document Number 423-41-57-14]**

**Document has not been base-lined.**

- **ICD between ECS and SIPS, Volume 2 SAGE III SCF Data Flows [Document Number 423-41-57-2]**

This volume provides specific information about the interfaces between ECS at the Langley DAAC and the SAGE III Science Investigator-led Processing System (SIPS), SAGE III SCF. The ECS and the SAGE III SCF are components of the EOSDIS. The interfaces defined are in support of routine EOS Standard Product generation and distribution for the SAGE III instrument on Meteor-3M.

Included are:

- Documentation references.
- Context information for the ECS-SAGE III SCF interfaces.
- Identification of standing order subscriptions for transfer of SAGE III MOC Level 0, orbit, attitude and other ancillary data from ECS to SAGE III SCF for routine EOS Standard Data Processing including data product granule size and transfer frequency.

Identification of EOS Standard Products generated by SAGE III SCF along with other products generated by the SAGE III SCF that directly support EOS Standard Products for transfer to ECS for archive and distribution including data product granule size and transfer frequency.

- **ICD between ECS and SIPS, Volume 3 ASTER OSF [Document Number 423-41-57-3]**

This volume provides specific information about the interfaces between ECS at the EROS Data Center and the ASTER OSF Parser System. The ECS and the ASTER OSF Parser System are components of the EOSDIS. The interfaces defined are in support of routine production of ASTER Parsed Observation Schedule Files used in ASTER Expedited Science Processing at EROS Data Center. The files will be transferred according to the protocols defined in the SIPS ICD Volume 0.

Included are:

- Documentation references.
- Context information for the ECS-ASTER OSF Parser System interfaces.
- Identification of products generated by ASTER OSF Parser System for transfer to ECS for archive and distribution including data product granule size and transfer frequency.

- **ICD between ECS and SIPS, Volume 4 ASTER DEM [Document Number 423-41-57-4]**

This volume supplements the ECS-SIPS ICD with interface configurations and data type specifications specific to the ASTER DEM-ECS interface.

This volume provides information specific to the interface at the EROS Data Center DAAC (EDC) for transfer of ASTER Digital Elevation Model (DEM) data into the ECS. It does not address (1) the user's interface for ordering ASTER DEM product; (2) operational procedures that may form the context for the system interface with ECS; or (3) technical specifications for the SIPS interface, which are maintained in ECS-SIPS ICD.

Included are:

- Documentation references
- Context and infrastructure information for the ASTER DEM-ECS interface
- Identification of ASTER DEM products transferred to ECS for archive and distribution. Data product granule size and transfer frequency are included

- **ICD between ECS and SIPS, Volume 5 MOPITT Data Flows [Document Number 423-41-57-5]**

This volume provides specific information about the interfaces between ECS at the LaRC DAAC and the MOPITT Science Investigator-led Processing System (SIPS). The ECS and the MOPITT SIPS are components of the EOSDIS. The interfaces defined are in support of routine EOS Standard Product generation and distribution for the MOPITT instrument aboard the Terra spacecraft.

Included are:

- Documentation references.
- Context information for the ECS-MOPITT interfaces.

- Identification of standing order subscriptions for transfer of Level 0, orbit, attitude and other ancillary data from ECS to MOPITT for routine EOS Standard Data Processing including data product granule size and transfer frequency.
- Identification of EOS Standard Products generated by MOPITT along with other products generated by the MOPITT that directly support EOS Standard Products for transfer to ECS for archive and distribution including data product granule size and transfer frequency.

- **ICD between ECS and SIPS, Volume 6 MODIS (MODAPS) [Document Number 423-41-57-6]**

**Document has not been base-lined. Pending CCR = 423-41-57-010 "Baseline MODAPS SIPS ICD"**

- **ICD between ECS and SIPS, Volume 7 AMSR-E [Document Number 423-41-57-7]**

This document is written to formalize the interpretation and general understanding of the interfaces between the non-ECS components of the AMSR-E SIPS and the ECS components of the NSIDC DAAC. This document is intended to provide clarification and elaboration of the ECS/non-ECS system interfaces at the AMSR-E SIPS to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions between the AMSR-E SIPS, and the ECS at the NSIDC DAAC via the ESDIS Configuration Control Board (CCB).

This volume provides specific information about the interfaces between EOSDIS Core System (ECS) at the National Snow and Ice Data Center (NSIDC) and the Advanced Microwave Scanning Radiometer-EOS (AMSR-E) Science Investigator-led Processing System (SIPS). The interface for the transfer of AMSR-E L1A data from the NSIDC DAAC-Unique System to the ECS is documented in the ICD between ECS and the NSIDC DAAC and is not contained in this ICD (see Applicable Document #423-41-45). The ECS and the AMSR-E SIPS are components of the EOSDIS. The interfaces defined are in support of routine EOS Standard Product generation and distribution for the AMSR-E instrument aboard the Aqua, also known as the PM-1, spacecraft. Discussion of non-ECS components to the AMSR-E SIPS are given in order to provide a better picture of the overall ground system processing of the AMSR-E data. Interface control documents between the non-ECS components and the AMSR-E SIPS will be written and maintained by their respective organizations.

Included are:

- Documentation references.
- Context information for the interfaces between ECS and AMSR-E SIPS.
- Identification of routine transfers of Level-1A data from NASA/Jet Propulsion Laboratory (JPL) Physical Oceanography (PO) DAAC to AMSR-E SIPS for routine EOS Standard Data Processing including data product granule size and transfer frequency.

- Identification of EOS Standard Products generated by AMSR-E SIPS along with other products generated by the AMSR-E SIPS that directly support EOS Standard Products for transfer to ECS at the NSIDC DAAC for archive and distribution, including data product granule size and transfer frequency.
- The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to, and assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS Project Manager.

- **ICD between ECS and SIPS, Volume 8 MLS Data Flows [Document Number 423-41-57-8]**

This volume provides specific information about the interfaces between the EOSDIS Core System (ECS) at the GSFC Distributed Active Archive Center (DAAC) and the Microwave Limb Sounder (MLS) Science Investigator-led Processing System (SIPS). The ECS and the MLS SIPS are components of the EOSDIS. The interfaces defined are in support of routine EOS Standard Product generation and distribution for the MLS instrument aboard the NASA EOS Aura spacecraft.

Included are:

- Documentation references.
- Context information for the ECS-MLS interfaces.
- Identification of ECS subscriptions for transfer of orbit, attitude, and other ancillary data from ECS to MLS for routine EOS Standard Data Processing including data product granule size and transfer frequency.
- Identification of EOS Standard Products generated by MLS along with other products generated by the MLS SIPS that directly support EOS Standard Products for transfer to ECS for archive and distribution, including data product granule sizes, and transfer frequency.

- **ICD between ECS and SIPS, Volume 9 MTMGW [Document Number 423-41-57-9]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between external Science Investigator-Led Processing Systems (SIPS) and the ECS to support reprocessing by the external systems. This document provides clarification and elaboration of those interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document specifies the interface design of a custom software gateway to implement the requirements for reprocessing support in Earth Science Data and Information System (ESDIS) document 423-42-03, Interface Responsibilities for Standard Product Generation Using Science

Investigator-Led Processing Systems. This reprocessing support consists of a Machine-to-Machine search and order Gateway (MTMGW) interface between the Science Investigator-Led Processing Systems (SIPS) and ECS. However, use of this interface will not be limited to SIPS.

This document does not include ECS Release or Drop schedules. Information about schedules for implementation of the Machine-to-Machine Gateway is contained in the SDPS Program Schedule.

- **ICD between ECS and TSDIS [Document Number 505-41-35]**

**No document available on the web site.**

- **ICD between EMSn and ECS Elements [Document Number 423-35-01]**

**Document has not been base-lined. Pending CCR = 423-35-01-001 "Baseline new EMSn-ECS Elements ICD"**

- **ASTER L1 Browse Data Product Specification [Document Number AG-E-E2213-R01]**

**No document available on the web site.**

- **ASTER L1 Data Products Specification [Document Number AG-E-E-2209-R01]**

This document defines the ASTER L1A and L1B data type, structure and format. (No purpose or scope provided in this document.)

- **DFCB for Landsat 7 Processing System Output Files [Document Number 510-3FCD/0195]**

This data format control block book (DFCB) defines detailed formats of the output (Level 0R, metadata, and multi-band browse) files generated by the Landsat 7 Processing System (LPS). The LPS makes these files available, on a Landsat 7 contact period basis, for pick up by the EROS Data Center (EDC) Distributed Active Archive Center (EDC DAAC).

The LPS output file formats described in this DFCB are based on the requirements contained in the *LPS Functional and Processing Specification (F&PS)* and the *Interface Control Document (ICD) Between the EOSDIS Core System (ECS) and the Landsat 7 System (Applicable Document 2.1.2)*.

This DFCB describes the data contents and Hierarchical Data Format (HDF) details for the LPS output files. The functional, performance, operational and interface design details for the transfer of these files from LPS to the ECS EDC DAAC are contained in the ECS-L7 ICD. The contents of the LPS output files defined in this DFCB are based on the Landsat 7 ETM+ instrument and payload correction data (PCD) details contained in the *Landsat 7 Data Format Control Book, Volume IV - Wideband Data,* the *LPS F&PS, the ECS-L7 ICD,* and the HDF documents/specifcations available from the ECS Project and/or the National Center for Supercomputing Applications (NCSA).

The file formats contained in this DFCB are applicable to the interface between the ECS EDC DAAC and the LPS. This DFCB does not contain specific details on the file formats for the

Landsat 7 level 0R products generally requested by the Landsat 7 users and provided by the Landsat 7 users, are defined in a separate document, the *Landsat 7 0R Distribution Product DFCB* (Applicable Document 2.1.9).

- **DFCB for Landsat 7 Zero-R Distribution Products, Volume 5 Book 1 [Document Number 430-11-06-007-3]**

This document is the Data Format Control Block (DFCB) for the Landsat 7 Level 0 reformatted (0R) distribution product. It focuses on the Hierarchical Data Format (HDF) of the Landsat 7 0R product available from the Earth Resources Observation System (EROS) Data Center (EDC) Distributed Active Archive Center (DAAC).

This DFCB provides the user with a high-level description of the Landsat 7 0R distribution product, the HDF structuring mechanisms employed, and a detailed layout of the image and ancillary data formats. The 0R format described in this DFCB is also a potential candidate for use as the format for data interchange between international ground stations (Ids). The DFCB explicitly describes the 0R product created by the U.S. but is flexible in its treatment of certain data fields that are potentially unique to the U.S. processing approach. These fields exist both in the binary and metadata files and are flagged with a unique fill value. The intent here is to facilitate data interchange by defining a 0R product format that is easier for the IGS community to use and implement.

This DFCB also contains a section of HDF example programs as well as the methodologies employed by EDC-DAAC for populating certain 0R fields during product creation.

The Landsat 7 System, unlike earlier Landsat programs, was not designed to produce high-level products for users, although a limited systematic correction capability has been added to the ground system. The primary user product is 0R data -- an essentially raw data form that is marginally useful prior to radiometric and geometric correction. A Landsat 7 product, however, does not contain all the ancillary data required to perform these corrections, including a calibration parameter file (CPF) generated by the Landsat 7 Image Assessment System (IAS). The CPF, which is updated at least four times a year, provides users with enhanced processing parameters for producing rectified image data of superior quality.

The product delivered to Landsat 7 data uses is packaged in HDF, which is an open standard selected by the National Aeronautics and Space Administration (NASA) for Earth Observing System (EOS) data products. HDF is a self-describing format that allows an application to interpret the structure and contents of a file without outside information. HDF allows Landsat 0R products to be shared across different platforms without modification and is supported by a public domain software library consisting of access tools and various utilities.

- **DFCD for EMOS ICC Planning and Scheduling [Document Number 423-41-60]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It is submitted as a separate Data Format Control

Document because otherwise it would logically have to be included in more than one other interface control document.

The purpose of this document is twofold: (1) to provide a vehicle to maintain EMOS AM-1 planning and scheduling file formats under configuration control and (2) to gather the information into a document that is independent of specific interfaces to facilitate dissemination to all affected parties.

This ICD is the data format control document for the planning and scheduling file interface between the ECS SDPS and EMOS. It controls header and file formats for the EMOS AM-1 planning and scheduling message files and explains the functions and interrelationships of the messages.

- **Interface Control Document Between EOSDIS Core System (ECS) and the Marshall Space Flight Center (MSFC) Distributed Active Archive Center (DAAC) [Document Number 209-CD-009]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and non-ECS components of the MSFC DAAC. This document provides clarification and elaboration of the ECS/non-ECS system interfaces at the MSFC DAAC to the extent necessary to assure hardware, software and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions via the ESDIS Configuration Control Board.

This ICD defines the external interfaces (i.e., between ECS and non-ECS components) within the MSFC DAAC

- **Interface Control Document Between EOSDIS Core System (ECS) and the Alaska SAR (Synthetic Aperture Radar) Facility (ASF) Distributed Active Archive Center (DAAC) for the ECS Project [Document Number 209-CD-021]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and non-ECS components of the ASF DAAC unique system. This document is intended to provide clarification and elaboration of the ECS/non-ECS system interfaces at the ASF DAAC to the extent necessary to assure hardware, software and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface behavior definitions via the ESDIS Configuration Control Board.

This ICD defines the external interfaces (i.e., between ECS and non-ECS components) within the ASF DAAC unique system for the Release B.

ECS Releases are keyed to ECS mission support: Release IR-1 provides support to TRMM Early Interface Testing and Science Algorithm I&T. Release B provides support to EOS AM-1 Mission Operations and Science Operations and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B also provides archive and distribution services for the Landsat 7 mission. In addition, support is provided for the international missions at the ASF DAAC consisting of ERS-1, ERS-2, JERS-1 and RADARSAT.

This ICD does not address:

a. Data flows for V0-to-V1 data migration ---these data flows are fully addressed in the Version 1 Data Migration Plan White Paper, dated 1/95

b. Version 0 catalog interoperability data flows; these are included in the Interface Control Document Between the EOSDIS Core System (ECS) and the Version 0 System

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to and assessed at the ESDIS Project level. This ICD will be approved under the signature of the ESDIS Project Manager.

This document reflects the technical baseline maintained by the ECS Configuration Control Board in accordance with ECS technical direction (see Section 2.2).

- **Interface Control Document Between EOSDIS Core System (ECS) and the Earth Resources Observation System (EROS) Data Center (EDC) [Document Number 209-CD-031]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation of the interface between ECS and the EDC, for the Digital Elevation Model (DEM) data and for the DORRAN system, to the extent necessary to assure hardware, software and operational service compatibility within the end-to-end system. This ICD also provides a control point for the definition of interfaces between the ECS and the EDC.

This ICD defines the detailed design of interfaces between the ECS and the EDC. These interfaces are for 1) ancillary DEM data and 2) the billing and accounting system at EDC

(Distributed Ordering, research, Reporting and Accounting Network [DORRAN]). These interfaces satisfy the requirements specified in Appendix A of this ICD.

Certain implementation details are not suitable for or specified in this document. Such items as contact address, telephone or fax numbers, internet host identifiers, values for operator tunable parameters such as number of retries on failure or time-outs should be documented in an Operations Agreement or Operations Procedure document under the control of the Distributed Active Archive Center (DAAC). The term "Operations Agreement(s)" in this document refers to such a document though the particular documentation name may vary from DAAC to DAAC.

This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the Science Data Processing Segment (SDPS) Program Schedule.

- **Interface Control Document Between EOSDIS Mission Operations Segment (EMOS) and the Science Data Processing Segment (SDPS) for the ECS Project [Document Number 209-CD-033]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS SDPS and the EMOS in general. This document provides clarification and elaboration of those interfaces to the extent necessary to assure hardware, software and operational service compatibility within the end-to-end system. This document provides a point of mutual control of external interface definitions via the ESDIS Configuration Control Board.

The scope of this document is determined by requirement DADS0160 in the Goddard Space Flight Center Functional and Performance Requirements Specification for the Earth Observing System Data and Information System Core System. That requirement specifies that the SDPS will archive EMOS History Data and Activity Schedules. This document covers the interface mechanisms employed for transfer of those two categories of data as well as Aqua carry out Files from EMOS to SDPS and contains other information essential for successful implementation of the interfaces.

- **Data Format Control Document for EMOS to ICC Planning and Scheduling Files for the ECS Project [Document Number 209-CD-034]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It is submitted as a separate Data Format Control Document because otherwise it would logically have to be included in more than one other interface control document.

The purpose of this document is twofold: (1) to provide a vehicle to maintain EMOS Am-1 planning and scheduling file formats under configuration control and (2) to gather the information into a document that is independent of specific interfaces to facilitate dissemination to all affected parties.

This ICD is the data format control document for the planning and scheduling file interface between the ECS SDPS and EMOS. It controls header and file formats for the EMOS AM-1 planning and scheduling message files, explains the functions and interrelationships of the messages and provides associated time-line information needed to use them effectively.

- **Interface Control Document for the Machine-to-Machine Search and Order Gateway for the ECS Project [Document Number 209-CD-035]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between external Science Investigator-Led Processing Systems (SIPS) and the ECS to support reprocessing by the external systems. This document provides clarification and elaboration of those interfaces to the extent necessary to assure hardware, software and operational service compatibility within the end-to-end system.

This document specifies the interface design of a custom software gateway to implement the requirements for reprocessing support in Earth Science Data and Information System (ESDIS) document 423-42-03, Interface Responsibilities for Standard Product Generation Using Science Investigator-Led Processing Systems and ECS. This reprocessing support consists of a Machine-to-Machine search and order Gateway (MTMGW) interface between SIPS and ECS. However, use of this interface will not be limited to SIPS.

- **Interface Control Document for ECS Interfaces that Support External Subsetters Located at DAACs [Document Number 209-CD-036]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between external subsetting appliances and the. This document provides clarification and elaboration of those interfaces to the extent necessary to assure hardware, software and operational service compatibility within the end-to-end system.

This document is the design specification for the various interfaces at a DAAC between generic subsetting appliances external to the ECS and the ECS at the same DAAC. Configurable information for a specific subsetting appliance and DAAC will be found in operational documents for the specific DAAC.

Related information about other interfaces on which the ECS-Subsetter interfaces are dependent is also included.

This document does not include Release or Drop schedules. Information about schedules for implementation of ECS external Subsetter interfaces is contained in the Synergy Program Schedule.

- **Interface Control Document Between the ECS and the Product Distribution System Information Server (PDSIS) [Document Number 230-TP-002]**

This technical paper is being published to ensure that the operations concept and interface specification for the integration of the EDC Product Distribution System (PDS) into the ECS are permanently documented and that the documentation is accessible to whomever may need it.

This technical paper was originally published to document the initial implementation of the described capabilities in ECS Release 5BX and is updated as necessary to support further changes.

- **EDG Message Protocol (EOS Data Gateway Messages and Development Data Dictionary V0 and ASTER/ECS Message Passing Protocol Specification) [Document Number 423-42-06]**

This document defines the message structure to be used in the base protocol transfer between the EOS Data Gateway and Version 0 Servers and V0-ECS gateway which speak the V0 base protocol. This dictionary also includes information on messages and fields added to support the ASTER/ECS gateway. Some parts of these messages are never generated or are ignored by some of these systems. Some messages, such as those describing order status queries, are being proposed and discussed and may still be subject to change. This document also defines "chunking algorithm" used to segment large inventory results messages into smaller pieces.

One advantage in processing ODL is that any added fields do not affect existing code as long as that code is not looking for those fields. Beyond this base protocol there may be additional messages and additional fields in messages passed by some V0 Clients and V0 Servers. The state machine details how to respond to unexpected requests. Additional fields in base ODL requests may be ignored; indeed, the servers will not even notice them if they do not look for them. Additional fields in replies will always be optional; servers should not need to provide information outside this base protocol.

- **ICD Between ECS and NASA Institutional Support System (NISS) [Document Number 505-41-21]**

This Interface Requirement Document (IRD), Contract Data Requirement List (CDRL) Item 039, whose requirements are specified in Data Item Description (DID) 219/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It defines the ECS requirements for interfacing with the NASA Institutional Support Systems.

The purpose of this IRD is to formally acknowledge the ECS interfaces with the NASA Institutional Support Systems and to define interface requirements that will be tested during ECS

integration. In the preparation of this IRD, Level 3-equivalent interface requirements were derived and extracted from the Functional and Performance Requirements Specification for the EOSDIS Core System.

This document also acknowledges the applicability of existing interface documentation, which has already been developed by the NASA Institutional Support Systems. ECS will adopt and conform to these existing ICDs and established interface procedures.

This IRD defines the ECS system requirements for interfacing with the NASA Institutional Support Systems. The NASA Institutional Support Systems are the Space Network (SN) (which includes the Tracking and Data Relay Satellite System [TDRSS] and the Network Control Center [NCC]), the Alaska Ground Station (AGS), the Svalbard Ground Station (SGS), the Wallops Orbital Tracking Station (WOTS), and the Flight Dynamics Facility (FDF). The EPGS (EOS Polar Ground Station) includes SGS and AGS.

The requirements identified in this IRD are the Level 3-equivalent ECS requirements for interfacing with the NASA Institutional Support Systems. Detailed requirements specific to each EOS mission (AM-1, PM-1, etc.) will be defined in ECS Level 4 requirements. These mission-specific requirements will be documented in the ECS Segment Requirements Specification, DID 304/DV1.

NASA Institutional Support System requirements for interfacing with ECS are not covered in this IRD; these requirements will be defined in the Detailed Mission Requirements (DMR) documents for the various EOS missions.

This IRD will be approved under the signature of the ESDIS Project Manager.

- **ICD Between ECS and Version 0 System for Interoperability [Document Number 505-41-30]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) Item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and the V0 System IMS. This document provides a point of mutual control of external interface definitions via the ESDIS Configuration Control Board (CCB).

This Interface Control Document (ICD) defines the system interfaces that exist between ECS and the EOSDIS V0 System Information Management System (IMS) for Level 3 one-way catalog interoperability. This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

This ICD does not address internetworking (e.g., topologies, protocols, etc.) for V0-to-ECS one-way catalog interoperability--this topic is addressed in each of the ECS to DAAC ICDs.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to and assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS Project Manager.

This document reflects the ECS technical baseline, maintained by the ECS Configuration Control Board in accordance with ECS technical direction (see Section 2.2).

- **ICD Between ECS and ASTER Ground Data System [Document Number 505-41-34]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interface between ECS and the ASTER GDS. This document provides clarification and elaboration of the ECS-ASTER GDS interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions by ESDIS and the ASTER GDS Project.

This ICD defines all of the system interfaces that exist between ECS and the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Ground Data System (GDS).

The ESDIS Project has joint responsibility with the ASTER GDS Project for the development and maintenance of this ICD. Any changes in the interface must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This ICD will be approved under the signatures of the ESDIS and the Earth Remote Sensing Data Analysis Center (ERSDAC) ASTER GDS Project Managers.

- **ICD Between the GSFC DAAC TSS and TSDIS [Document Number 423-41-35]**

This document is written to formalize the interpretation and general understanding of the interfaces between TSS and TSDIS. The purpose of these interfaces is for TSS to archive TRMM science data products, distribute TRMM products to TSDIS for reprocessing, distribute ancillary data to TSDIS for processing and reprocessing, and distribute TRMM products to TSDIS Science Users (TSUs). This document provides clarification and elaboration of these interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions for the ESDIS and TSDIS Configuration Control Boards (CCBs).

- **ICD Between ECS and EOS-AM Project for AM-1 Spacecraft Analysis System [Document Number 505-41-38]**

This Interface Control Document (ICD), Contract Data Requirement List (CDRL) Item 029, whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

This ICD is written to formalize the interpretation and general understanding of the ECS/AM-1 Spacecraft Analysis System interface. This document provides clarification and elaboration of the SAS interface to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control for these interface definitions for the ESDIS and AM Project Configuration Control Boards (CCBs)**.**

This ICD provides definition for the system interfaces that exist between ECS and the EOS-AM Project for the AM-1 Spacecraft Analysis System (SAS).

The Earth Science Data and Information System (ESDIS) Project has joint responsibility with the AM Project for the development and maintenance of this ICD**.** Any changes in the interface definition must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS and AM Project Managers.

ECS Releases are keyed to mission support: Release IR1 provides support to the Tropical Rainfall Measuring Mission (TRMM) Early Interface Testing and Science Algorithm I&T. Release A provides support to TRMM Science Operations and TRMM Ground Systems Certification Testing. Release A also provides the functional capabilities needed to support early ESDIS Ground System Testing for the EOS AM-1 and Landsat 7 missions. Release B provides support to EOS AM-1 Mission Operations and Science Operations, and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B also provides archive and distribution services for the Landsat 7 mission. Releases C & D provide evolutionary enhancements to the ECS services provided in the earlier Releases.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction No. 11, dated December 6, 1994.

- **ICD Between ECS and the GSFC DAAC [Document Number 505-41-40]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces to transfer ancillary data to ECS from non-ECS components of the GSFC DAAC. This document provides clarification and elaboration of the ECS interfaces with non-ECS systems at

the GSFC DAAC to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.
This Interface Control Document (ICD) defines the external interfaces for transfer of ancillary data to ECS at any Distributed Active Archive Center (DAAC) from the Data Link Server at the Goddard Space Flight Center (GSFC) DAAC. This document does not include ECS Release or Drop schedules. Information about schedules for implementation of external interfaces is contained in the SDPS Program Schedule.

In particular, this ICD describes the following:

a. Internetworking
    1. for ECS-to-Version 0 (V0) and ECS-to-GDAAC Data Link Server/larry ancillary data transfer (needed to support ECS standard product generation at the GSFC DAAC and/or at other sites)
    2. for V0/ECS interoperability [interface addressed in detail in "Interface Control Document between the EOSDIS Core System (ECS) and the Version 0 System for Interoperability"]
    3. between ECS and the GSFC Campus via external networks
b. ECS-to-GDAAC Data Link Server data flows, specifically, for accessing ancillary data products needed to support ECS standard product generation.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to, and assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS Project Manager.

- **ICD Between ECS and ORNL DAAC [Document Number 505-41-42]**

**No document available on the web site.**

- **ICD Between ECS and JPL Physical Oceanography DAAC [Document Number 423-41-44]**

**No document available on the web site.**

- **ICD Between ECS and ESDIS Level-1 Product Generation System (LPGS) [Document Number 423-41-55]**

**No document available on the web site.**

- **ICD between EMOS and SDPS [Document Number 423-41-63]**

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000).

This document is written to formalize the interpretation and general understanding of the interfaces between ECS SDPS and the EMOS in general. This document provides clarification

and elaboration of those interfaces to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

The scope of this document is determined by requirement DADS0160 in the Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System Core System. That requirement specifies that the SDPS will archive EMOS History Data and Activity Schedules. This document covers the interface mechanisms employed for transfer of those two categories of data, as well as Aqua Carryout Files, from EMOS to SDPS and contains other information essential for successful implementation of the interfaces.

- **ICD Between the GSFC DAAC TSS and the LaRC DAAC TRMM Information System (LaTIS) for Support of TRMM [Document Number 423-42-02]**

This is an Interface Control Document for the Version 1 LaRC and GSFC DAACs. The information in this document was obtained from the TSS and LaTIS web sites.

The TSS web site address is:

http://daac.gsfc.nasa.gov/TECHNICAL/fallback/interfaces/gdaac_ldaac_icd.html

The LaTIS web site address is:

http://eosweb.larc.nasa.gov/~latisweb/

The purpose of this document is to document the inter-DAAC data flows, now that the EOSDIS Core System (ECS) will not be used to support TRMM.

This paper covers the operational data flows between the LaRC and the GSFC DAACs with respect to TRMM support. The original intent of this document was to maintain a working agreement between the DAACs for exchange of ancillary and VIRS 1B data in support of the TRMM mission. The decision to baseline this document through the ESDIS ICWG was for informational purposes only. This is not intended to be a detailed interface document.

- **ICD between EMSn and DAACs [Document Number 540-032]**

The purpose of this document is to provide a detailed definition of the interface(s) between the EOSDIS Core System (ECS) DAACs and EMSn. EMSn will support connectivity among all of the ECS DAACs, connectivity between the DAACs and the Systems Monitoring and Coordination Center (SMC), and connectivity between the DAACs and other data product systems including the Landsat Processing System (LPS), Science Data Processing Facility (SDPF), and the National Oceanic and Atmospheric Administration (NOAA) Affiliated Data Center (ADC). All data flows into and out of the ECS DAACs that are supported by EMSn are considered to be science traffic.

This ICD defines and controls the functions, communications protocol(s), frame formats, and electrical characteristics of the interfaces between EMSn-provided equipment, software, and communications paths and other entities that directly interface with the network. Interfaces provided by NISN are included in the scope of this document. Interfaces between EMSn users and other systems not provided by NISN are not within the scope of this document.

- **ICD between FDS and EMOS for Aqua [Document Number FDS-EMOS-Aqua]**

This interface control document (ICD) defines the interface between the EOS Aqua/PM Flight Dynamics System and the EOS Mission Operations System (EMOS). This document contains sufficient detail about the interfaces to develop and operate each of the interfaces described. Therefore, this document is intended for use only by those directly involved with the mission. No attempt has been made to relate this ICD to the total EOS Aqua/PM ground system or to non-pertinent aspects of the organizations involved.

This ICD covers the delivery and receipt of products between the FDS and other organizations for pre-launch analysis, training and simulation activities through the launch, early mission, operations, and end-of-life activities.

Flight Dynamics (FD) is responsible for providing orbit, attitude, and mission analysis support to the EOS Aqua/PM mission. Orbit support includes orbit determination, generation of definitive and predictive orbit ephemeris, and generation of on-board orbit computation required input parameters. The navigation data sources for the mission will be a combination of Tracking and Data Relay Satellite System (TDRSS), WGS and EPGS tracking passes. TDRSS will provide a minimum of two passes per day primarily for clock correlation, but tracking data will also be collected. WGS will be required to take 2 tracking passes per day and EPGS will be required to take one tracking pass per orbit (either Alaska Ground Station (AGS) or Svalbard Ground Station (SGS)). Attitude responsibility include ground attitude determination and control support, attitude sensor alignment and calibration, and evaluation of the on-board attitude control system (ACS) performance. The FD operational phase will be supported by the FOT. The Aqua/PM mission Flight Dynamics Team (FDT) is also responsible for providing pre-mission analysis and mission planning aids for both pre-launch testing/simulations and the mission phases identified below. The FDT will provide support during pre-launch, launch acquisition, and checkout mission phases of EOS Aqua/PM.

- **ICD between FDS and GDAAC for Aqua [Document Number FDS-GDAAC-Aqua]**

The purpose of this interface control document (ICD) is to completely describe the interface between the EOS Aqua/PM Flight Dynamics System and the Goddard Distributed Active Archive Center (GDAAC). This document contains sufficient detail about the interface to develop and operate the interface described. Therefore, this document is intended for use only by those directly involved with the mission. No attempt has been made to relate this ICD to the total EOS Aqua/PM ground system or to non-pertinent aspects of the organizations involved.

- **ICD between Landsat 7 and IGS [Document Number 430-11-06-009-E]**

This Interface Control Document (ICD) establishes the hardware, software, data transfer, and operations interface requirements between the International Ground Stations (IGS) and the Landsat 7 Project.

Landsat 6 documentation was used as the starting point for this ICD. However, modifications have been made to accommodate the Landsat 7 System architecture.

- **Landsat 7 System Calibration Parameter File Definition Document [Document Number 430-15-01-002-3]**

This document describes the contents of the calibration parameter file (CPF) generated by the Image Assessment System (IAS), an element of the Landsat 7 Ground Segment. The IAS is responsible for off-line assessment of image quality to ensure compliance with the radiometric and geometric requirements of the Landsat 7 spacecraft and the Enhanced Thematic Mapper Plus (ETM+) sensor throughout the mission's life.

In addition to its assessment functions, the IAS is responsible for the radiometric and geometric calibration of the Landsat 7 satellite and ETM+. The IAS periodically performs radiometric and geometric calibration and updates the CPF. This file is stamped with applicability dates and sent to the Earth Resources Observation System (EROS) Data Center (EDC) Distributed Active Archive Center (DAAC) for storage and eventual bundling with outbound Level 0 reformatted (0R) products. The CPF also is sent to international ground stations (IGSs) via the Landsat 7 Mission Operations Center (MOC). The CPF supplies the radiometric and geometric correction parameters required during Level 1 (L1) processing to create superior products of uniform consistency across the Landsat 7 system.

- **ICD between EDOS and EGS [Document Number 423-ICD-EDOS/EGS]**

This document presents the design details for the interface between the Earth Observing System (EOS) Data and Operations System (EDOS) and the EOS Ground System (EGS) elements and between the EOS Real-time Processing System (ERPS) and the EGS elements. Although there are many EGS elements, this Interface Control Document (ICD) only focuses on the EOS Data and Information System (EOSDIS) Core System (ECS). EDOS and ERPS interface with other EGS elements such as the Japanese Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Ground Data System (GDS), and the National Oceanic and Atmospheric Administration (NOAA), which are discussed in separate ICDs.

The ECS consists of three segments: the Flight Operations Segment (FOS), the Science and Data Processing Segment (SDPS), and the Communications and Systems Management Segment (CSMS). The EOS Operations Center (EOC) is part of the FOS. The System Monitoring and Coordination Center (SMC) is part of the CSMS and is located at Goddard Space Flight Center (GSFC). The SDPS is a distributed system that includes functional elements located at the Distributed Active Archive Centers (DAACs) such as GSFC, LaRC, EDC and NSIDC.

EDOS provides capabilities for return link data capture, data handling, data distribution, and archival data storage.

The SDPS interfaces with EDOS to provide a set of ingest, processing, and distribution services for the entire EOSDIS. The SDPS processes Level 0 EOS spacecraft instrument data that it receives from EDOS into Level 1-4 data products. It provides short and long-term data storage, and distributes the data to other EOS users. The SDPS contains a distributed data and information management function, including a catalog system in support of user data selection and ordering.

The EOC provides Command Data Blocks, which include EDOS Ground Message Headers, Command Link Transmission Units (CLTUs) and acquisition sequences, to the ERPS. Subsequently, ERPS serializes the Forward Link commands for transmission to the EOS spacecraft. The EOC also has status and control interfaces with ERPS. The status interface provides an ERPS telnet session to monitor command and Low Rate processing activity. The control interface allows for changes to commanding attributes such as the data rate and idle pattern, as well as the capability to configure the ERPS hosts to receive Low Rate Return Link data. ERPS provides acknowledgement messages to EOC in response to the control messages. Low Rate Return Link data is processed by both ERPS and EDOS. ERPS transmits real-time EDUs and CLCW EDUs to the EOC, and EDOS transmits Rate Buffered files to the EOC (and other EGS Elements) via the EOS Mission Support network (EMSn).

The EOC receives contact schedules from the Space Network (SN) and from the Wallops Orbital Tracking Information System (WOTIS). The EOC reformats and forwards the schedules to EDOS.

For background information on the EDOS to EGS interface's functional and performance requirements, reference the Interface Requirement Document (IRD) between the EDOS and the EOS Ground System (EGS) Elements, (reference ICD Section 2, Applicable Document 3). For background information on the content of the data products delivered by EDOS, refer to the EDOS Functional and Performance Specification (reference ICD Section 2, Applicable Document 2), and the EDOS Data Format Requirements Document (DFRD), (reference ICD Section 2, Applicable Document 1).

For background information on the ECS's functional and performance requirements, refer to the Functional and Performance Requirement Specification for the ECS (reference ICD Section 2, Applicable Document 19).

For additional information on the EDOS to ASTER interface refer to ICD Section 2, Reference Document 14. For additional information on the EDOS to NOAA interface refer to ICD Section 2, Reference Document 14.

This ICD defines the interface and describes the connectivity and the information exchanged between EDOS, ERPS and the ECS. It is intended for all parties needing information as it describes the functional and performance interfaces between EDOS, ERPS and ECS.

- **EOSDIS Core System (ECS) Application Programming Interface (API) Interface Definition Document (IDD) for the ECS Project [Document Number 819-RD-001]**

This Interface Definition Document (IDD) is a required document specified in Change Order 1 to the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document is written to aid external users who wish to provide value-added capabilities to the ECS in understanding APIs and using them to interact with the ECS. This IDD has objectives to define what an API is within the ECS context, explain the prerequisites to interfacing with ECS via APIs, explain step by step how to use them and provide some additional insight via hints and an example.

The purpose of issuing interim or preliminary versions of this document prior to the final as-built version to be delivered with Release B is to assist the DAACs, SCFs and others who intend to extend or inter-operate with the ECS Release B system. The material in the preliminary version should be used by those planning such extensions to gain an understanding of the skills and information required to design and implement extensions and to gain an appreciation of the scope of the work. While these public interfaces (see Section 3.2) are expected to be fairly static, that are likely to undergo some changes during Release B construction, ranging from method signature changes to replacement of entire objects. Users of this document should be aware of the nature of documentation at this stage of development; dependence on precise details is not advised and is at the user's risk. Note also that the authoritative source for documentation of these public APIs is the final version of the Release B CSMS/SDPS Internal Interface Control Document for the ECS Project (DID 313).

This IDD defines and describes the Application Programming Interfaces (APIs) that external users can use to invoke any of a set of ECS functions, such as searching the science data server. Unless otherwise stated, all sections of this document apply to Release B. The information in this IDD is preliminary and will not be finalized until delivery of Release B is complete.

This document defines an API and explains the pre-conditions that must exist in order to successfully interface with ECS via the APIs. It describes each of the functions available to an external ECS user and explains how to invoke them in a step by step process. The relevant objects (APIs) and methods are given and code segments are included to show the details of calling a function. A section is provided for some insight to the ECS via the philosophy behind parts of the system. This section also provides some high level hints and rules of thumb for the programmer to keep in mind, as well as an example to flesh out the process.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this IDD. Any changes in the ECS system that affect this interface will be reflected in revisions to this document. This IDD will be approved under the signature of the ESDIS project Manager.

## 2.4 Interface Requirements Documents

The Interface Requirements Documents (IRDs) provide the requirements for the interfaces between the ECS and other external systems to provide data and services to the scientific community. The following list is a sampling of interface requirements documents developed between ECS and the external systems. The IRDs can be viewed in their entirety at the GSFC web site http://romulus.gsfc.nasa.gov/docview/docfinder or the ECS Project http://edhs1.gsfc.nasa.gov/waisdata/catalog/esdiscat.html web site.

- **EBnet IRD [Document Number 540-022]**

The purpose of this document is to describe the user data transport interfaces (e.g., protocols and standards) supported by EBnet and to specify the requirements that users must meet.

This document specifies the Interface Requirements for EBnet and specific user interface requirements at the three lowest layers (e.g., physical, data link, and network layers) of the

International Organization for Standardization (ISO) 7-Layer Reference Model for Open System Interconnection (OSI).

The applicable standards contain many options and implementation alternatives. Detailed options and alternatives associated with each standard protocol will be jointly identified and documented by the EBnet project and users in Interface Control Documents (ICDs). Voice requirements are detailed in the EOS Detailed Mission Requirements (DMR) documents.

- **I/F Responsibilities for Standard Product Generation using SIPS [Document Number 423-42-03]**

This document describes the joint responsibilities, activities and processes of the Science Team and the ESDIS Project for the processing, transfer, archive and distribution of products produced by Science Investigator-led Processing Systems (SIPS). This document also defines the requirements for interface between the ECS and the SIPS. Specifically, this document shall:

- Define the activities to be performed for the transfer of EOS data required by the SIPS for production from the ECS to the SIPS.
- Define the activities to be performed for the transfer of the SIPS products to the DAAC.
- Define the responsibilities of the Science Investigator, the Science Team, the ESDIS Project, and the DAAC for data processing, archive and distribution of SIPS products.
- Define the process for establishing and updating the implementation schedule.
- Define responsibilities for status reporting, coordination activities, and managing change during both implementation and operations phases.
- Define system interface requirements between the ECS and the SIPS.

This document is written to formalize the interpretation and general understanding of the interface between the SIPS and the ECS. For the Science Investigator, this document provides the interface requirements that the SIPS must satisfy to interact with the ECS for production of EOS Standard Products. For the ECS, this document provides a clarification and elaboration of the ECS/SIPS interface requirements from the Functional and Performance Requirements (Level 3) for the EOSDIS Core System. It is meant to stand alone as a total document and contains more detailed interface requirements than a Level 3 requirements specification.

The objective of this document is twofold. First, this document is intended to provide an understanding of the functional and performance requirements of a Science Investigator-led Processing System. This understanding is essential for the Science Investigator to develop a cost-effective proposal for Science Investigator-led processing. Secondly, this document is intended to provide a focus for defining a related Interface Control Document (ICD), which shall be jointly developed by the ESDIS Project and the affected Science Investigators, with input from the ECS implementor and the DAACs to cover each system interface identified in this IRD. The ICD will detail the ECS interface services developed to support the interface requirements. These interface services will be available to all SIPS. For each SIPS, an appendix to the ICD will

list interface details specific to that SIPS. Any SIPS-unique requirements will be placed in the appropriate SIPS-unique appendix to the ICD between the ECS and SIPS.

The ESDIS Project has responsibility for the development and maintenance of this IRD and the subsequent ICD. Any changes in the interface requirements must be agreed upon by the relevant participating parties and then assessed at the ESDIS Project level. This document will be approved under the signature of the ESDIS Project Manager and shall apply generally to all SIPS. Any interface requirements unique to individual SIPS will be handled separately.

This document defines the responsibilities of the ESDIS Project, the Science Investigator and Science Team, and the DAAC for production of EOS Standard Products using the adaptive approach to processing. While some of the responsibilities listed herein do also apply to EOS Standard Product production using the baseline system (i.e., production within ECS at a DAAC), this document specifically applies to interfaces between the ECS and approved SIPS. The document also serves as an Interface Requirements Document (IRD) for data system interfaces between the ECS and the SIPS.

- **IRD between ECS and ACRIM [Document Number 423-41-29]**

**No document available on the web site.**

- **IRD between ECS and ASTER GDS [Document Number 505-41-18]**

**No document available on the web site.**

- **IRD between ECS and Chem [Document Number 423-41-26]**

**No document available on the web site.**

- **IRD between ECS and DAS [Document Number 423-41-54]**

**No document available on the web site.**

- **IRD Between EOSDIS and the AM Project for AM-1 Flight Operations System [Document Number 505-41-15]**

This Interface Requirements Document (IRD), Contract Data Requirement List (CDRL) Item 039, whose requirements are specified in Data Item Description (DID) 219/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It defines the interface requirements between ECS and the Earth Observing System (EOS) AM Project for AM-1 Flight Operations.

This document is written to formalize the interpretation and general understanding of the interface between ECS and EOS AM Project and to provide a point of mutual control of external interface definitions for the ESDIS Configuration Control Board (CCB) and the CCB(s) serving the EOS AM Project**.**

The objective of this document is to provide a focus for defining related Interface Control Documents (ICDs) and other lower level documents, which will be jointly developed for each major subsystem interface identified in this IRD.

This IRD defines the system interfaces that exist between ECS and the EOS AM Project in support of AM-1 flight operations. Specifically, this document addresses ECS external interfaces that involve transmission/receipt of AM-1 spacecraft command and telemetry; the Spacecraft Simulator (SSIM); delivery of data bases and software, such as AM-1 data base information and spacecraft vendor-developed Spacecraft Analysis Software (SAS); the Instrument Support Terminal (IST) toolkit; AM-1 flight software maintenance; and operations training.

There are other ECS documents that are applicable to AM-1 instrument and data processing interfaces with the ECS. Interfaces supporting the Japanese Ministry of International Trade and Industry (MITI) Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument are defined in the IRD Between ECS and MITI ASTER Project. Interfaces between instrument Science Computing Facilities (SCFs) and the ECS for algorithm integration and test are defined in the IRD Between ECS and Science Computing Facilities. AM-1 interfaces involving other components of EOSDIS, such as those with the EOS Data and Operations System (EDOS), are addressed in other documents, as appropriate (refer to Section 2 for a listing of related documentation).

The Functional and Performance Requirements Specification for the EOSDIS Core System defines the ECS system requirements and user interface requirements, including requirements for the ECS IST toolkit and the general ECS science user interface for ordering science data products and AM-1 spacecraft data (archived telemetry, history logs, etc.) from ECS archives. ECS requirements for AM-1 instrument science data processing also are documented in the Functional and Performance Requirements Specification for the EOSDIS Core System.

ECS mission-specific requirements related to AM-1 flight operations will be defined in detail in the ECS Segment Requirements Specification, DID 304/DV1. This document will be available for AM-1 project review prior to being placed under Earth Science Data and Information System (ESDIS) Project configuration control.

This document supersedes the following preliminary ECS IRDs, which were delivered in August 1993:

> 193-219-SE1-012, Interface Requirements Document Between ECS and NASA Code 421/AM Spacecraft Simulator;
>
> 193-219-SE1-013, Interface Requirements Document Between ECS and Code 421 (AM Spacecraft) Spacecraft and Instrument Databases (SDB and IDBs);
>
> 193-219-SE1-014, Interface Requirements Document Between ECS and Code 421 (AM Spacecraft) Principal Investigators/Team Leads.

This IRD will be approved under the signature of the ESDIS Project Manager.

- **IRD between ECS and NISS [Document Number 505-41-21]**

This Interface Requirement Document (IRD), Contract Data Requirement List (CDRL) Item 039, whose requirements are specified in Data Item Description (DID) 219/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core

System (ECS), Contract (NAS5-60000). It defines the ECS requirements for interfacing with the NASA Institutional Support Systems.

The purpose of this IRD is to formally acknowledge the ECS interfaces with the NASA Institutional Support Systems and to define interface requirements that will be tested during ECS integration. In the preparation of this IRD, Level 3-equivalent interface requirements were derived and extracted from the Functional and Performance Requirements Specification for the EOSDIS Core System.

This document also acknowledges the applicability of existing interface documentation, which has already been developed by the NASA Institutional Support Systems. ECS will adopt and conform to these existing ICDs and established interface procedures.

This IRD defines the ECS system requirements for interfacing with the NASA Institutional Support Systems. The NASA Institutional Support Systems are the Space Network (SN) (which includes the Tracking and Data Relay Satellite System [TDRSS] and the Network Control Center [NCC]), the Alaska Ground Station (AGS), the Svalbard Ground Station (SGS), the Wallops Orbital Tracking Station (WOTS), and the Flight Dynamics Facility (FDF). The EPGS (EOS Polar Ground Station) includes SGS and AGS.

The requirements identified in this IRD are the Level 3-equivalent ECS requirements for interfacing with the NASA Institutional Support Systems. Detailed requirements specific to each EOS mission (AM-1, PM-1, etc.) will be defined in ECS Level 4 requirements. These mission-specific requirements will be documented in the ECS Segment Requirements Specification, DID 304/DV1.

NASA Institutional Support System requirements for interfacing with ECS are not covered in this IRD; these requirements will be defined in the Detailed Mission Requirements (DMR) documents for the various EOS missions.

This IRD will be approved under the signature of the ESDIS Project Manager.

- **IRD Between ECS and Version-0 System [Document Number 505-41-11]**

This Interface Requirement Document (IRD), Contract Data Requirement List (CDRL) item 039, whose requirements are specified in Data Item Description (DID) 219/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It defines the interface requirements between ECS and the V0 System.

This document is written to formalize the interpretation and general understanding of the interface between ECS and the V0 System. For ECS, this document provides clarification and elaboration of the ECS-V0 interface requirements from the "EOSDIS Core System (ECS) Functional and Performance Requirements Specification". It is meant to stand alone as a total document and contains more detail than a Level 3 requirements specification.

The objective of this document is to provide a focus for defining related Interface Control Documents (ICDs) which are jointly developed by ECS and the V0 System to define the design of each interface specified in this IRD.

This IRD defines the system interfaces that exist between ECS and the V0 System. ECS and V0 interface with other systems such as Affiliated Data Centers (ADCs), and international partners such as Japan and Europe. These interfaces are not addressed here, but are documented in other IRDs, such as ECS to NOAA ADC IRD. The use of the ECS to V0 interfaces will change over time as new releases of the ECS System are delivered. All the requirements for the interface between ECS and V0 are defined herein.

In addition to specifying the ECS to V0 interface requirements, this IRD identifies many of the implementation issues associated with this interface. The implementation issues are given here, not because they affect the IRD, but as a convenience for tracking Interface Control Document Issues.

As the ECS evolves, parts of the V0 System may become part of the ECS or be implemented as Distributed Active Archive Center (DAAC)-Unique extensions to ECS. This document identifies ECS to V0 interface requirements only. As parts of V0 transition to DAAC Unique elements, those requirements will be included in the DAAC Unique IRD(s).

The ECS and V0 projects are under the direction of the Earth Science Data and Information System (ESDIS) Project. The ESDIS Project has responsibility for the development and maintenance of this IRD. Any changes in the interface requirements must be agreed to by both V0 and the ECS Projects. This IRD will be approved under the signature of the ESDIS Project Manager.

- **IRD Between EOSDIS and the Landsat-7 System [Document Number 505-41-13]**

This Interface Requirements Document (IRD) defines the interface requirements between ECS and the Landsat 7 System. This IRD, Contract Data Requirements List (CDRL) item 039, whose requirements are specified in Data Item Description (DID) 219/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document was previously submitted under document number 193-219-SE1-003

This document was written to formalize the interpretation and general understanding of the interface between ECS and the Landsat 7 System. It is meant to stand alone as a total document and contains more detail than is provided in a Level 3 requirement's specification.

The objective of this document is to provide a focus for defining the related Interface Control Document (ICD) which is jointly developed for the major subsystem interfaces identified in this IRD.

This document provides a point of mutual control of external interface definitions for the ESDIS CCB and the Landsat 7 Project CCB**.**

This IRD defines all of the system interfaces that exist between ECS and the Landsat 7 System, including the Landsat Processing system (LPS), the Image Assessment System (IAS), the Mission Operations Center (MOC), the International Ground Stations (IGSs), and the Mission Management Office (MMO). Although the user interface is not discussed in detail, the products being distributed and the search capabilities are outlined. The ESDIS Project has joint

responsibility with the Landsat Project for the development and maintenance of this IRD. Any changes in the interface requirements must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project level. This IRD will be approved under the signature of the ESDIS Project Manager and will be under ESDIS Project configuration control.

- **IRD Between EOSDIS and the Tropical Rainfall Measuring Mission (TRMM) Ground System [Document Number 505-41-14]**

The requirements in this document pertain to the interface between the Earth Observing System (EOS) Data and Information System (EOSDIS) and the Tropical Rainfall Measuring Mission (TRMM) Ground System. The organizations responsible for the implementation of these requirements are the Earth Science Data and Information System (ESDIS) and TRMM Projects. This document identifies interfaces for which the TRMM and ESDIS Projects hold joint implementation responsibility. Interfaces will be defined between the EOSDIS and: 1) The TRMM Science Data and Information System (TSDIS), 2) The Sensor Data Processing Facility (SDPF) and 3) Institutional support systems that support the TRMM Ground System and connect directly to EOSDIS (i.e. Nascom). This IRD identifies the data management system interfaces that must exist for the successful support of TRMM by EOSDIS. In addition to identifying these interfaces, this document also describes data flows, specifies functional and performance requirements, and provides schedules for interface implementation and testing.

The remainder of this document identifies the EOSDIS to TRMM system interfaces and the organizational responsibilities. It also defines the requirements levied on those organizations and systems for the successful acquisition, processing, and distribution of TRMM science data and related data products.

Due to the cancellation of the EOSDIS Core System (ECS) Release A for TRMM, the ECS LaRC DAAC and the ECS GSFC DAAC for TRMM Support has been replaced by the TRMM Support System (TSS) at the GSFC DAAC and the Langley TRMM Information System (LaTIS) both of which are under the management of the ESDIS project. This document includes functional requirements for GSFC DAAC TSS and LaRC DAAC LaTIS.

This document was written to formalize the interpretation and general understanding of the interface between ESDIS and TRMM.

The objective of this document is to provide a focus for defining related Interface Control Documents (ICDs) which are jointly developed by EOSDIS and the interfacing projects to define the design of each interface specified in this IRD. It is anticipated that this IRD can spawn more than one ICD.

This document provides a point of mutual control of external interface definitions for the CCBs serving the ESDIS and TRMM projects. The requirements in this document will be traceable to the TRMM Ground System, EOSDIS, and the Sensor Data Processing Facility (SDPF).

This IRD defines all of the system interfaces that exist between EOSDIS and the TRMM Ground System**.** As such, it is intended to provide functional and performance specifications for the interfaces between the ESDIS project and TRMM related data systems. The MSFC LIS SCF is not under ESDIS management and therefore the requirements for this interface have been deleted from this IRD. This document is also intended to conform to the terms and conditions of the

Memorandum of Understanding (MOU) between the TRMM Project and the EOS Ground System Operations Project (GSOP) for Science Data Archive and Distribution Support, which is an Inter-Project Agreement (IPA) between the ESDIS Project and the TRMM Project. It should be noted that two EOS instruments, Clouds and Earth's Radiant Energy System (CERES) and Lightning Imaging Sensor (LIS), are included as "flights of opportunity" on the TRMM satellite. Only the interfaces between TRMM, EOSDIS, and SDPF for which the ESDIS and TRMM projects have joint responsibility are considered.

- **IRD Between EOSDIS and NASA Science Internet (NSI) [Document Number 505-41-17]**

This Interface Requirements Document (IRD), Contract Data Requirements List (CDRL) Item 039, whose requirements are specified in Data Item Description (DID) 219/SE1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It defines the interface requirements between ECS and the NASA Science Internet (NSI).

This document is written to formalize the interpretation and general understanding of the interface between ECS and the NSI. This document provides clarification and elaboration of the ECS–NSI interface requirements from the EOSDIS Core System (ECS) Requirements Specification. It is meant to stand alone as a total document and contains more detail than a Level 3 requirements specification.

The objective of this document is to provide a focus for defining the ECS-NSI Interface Control Document (ICD) to the interfaces identified in this IRD.

This document provides a point of mutual control of external interface definitions for the ESDIS CCB and the CCB(s) serving the NSI**.**

This IRD defines all of the system interfaces that exist between ECS and the NSI networks. The Earth Science Data and Information System (ESDIS) Project has joint responsibility with the NSI project for the development and maintenance of IRD sections that are relevant to the NSI interface**.** Any changes in the interface requirements must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This IRD will be approved under the signature of the ESDIS Project Manager and NSI.

- **IRD between ECS and NOAA ADC [Document Number 505-41-19]**

**No document available on the web site.**

- **IRD between ECS and PM-1 [Document Number 423-41-25]**

**No document available on the web site.**

- **IRD between ECS and SAGE III [Document Number 505-41-22]**

**No document available on the web site.**

- **IRD between ECS and SCFs [Document Number 505-41-12]**

**No document available on the web site.**

- **IRD between EOSDIS and NSI NON-ECS [Document Number 505-42-01]**

This Interface Requirements Document (IRD) is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) tasking to the NASA Science Internet (NSI). It defines the interface requirements between the ESDIS Project and the Earth Science Data and Information System (ESDIS) Project and the NASA Science Internet (NSI).

This document is written to formalize the interpretation and general understanding of the interface between ESDIS and the NSI. This document provides clarification and elaboration of the ESDIS-NSI interface requirements. It is meant to stand alone as a total document and contains more detail than a Level 3 requirements specification.

The objective of this document is to provide a focus for defining the ESDIS-NSI Interface Control Document (ICD) for the interfaces identified in this IRD.

This document provides a point of mutual control of external interface definitions for the ESDIS CCB.

This IRD defines all of the system interfaces that exist between the ESDIS Project and the NSI networks. Any changes in the interface requirements must be agreed to by the relevant participating parties, and then assessed at the ESDIS Project Level. This IRD will be approved under the signature of the ESDIS Project Manager and NSI.

- **IRD between EDOS and EGS [560-EDOS-0211.0001R1]**

This document presents the interface requirements for elements of the Earth Observing System (EOS) Ground System (EGS) to the EOS Data and Operations System (EDOS). EDOS is an EOS data handling and delivery system maintained and operated by the Flight Programs and Project Directorate (FP&PD) directorate, and is an element of the EOS Data and Information System (EOSDIS).

This document is a supplement to the EDOS Functional and Performance Specification. The purpose of this document is to provide further detail regarding the requirements for the external interfaces described in the EDOS Functional and Performance Specification. This document identifies all functional and performance specifications describing the data to be exchanged as part of the EDOS-EGS Elements interface.

This document provides the functional and performance interface requirements for all EGS Elements receiving EDOS services. It is intended for all parties needing information describing an EGS Elements interface with EDOS and the EOS Real-time Processing System (ERPS), including system engineers and system designers responsible for implementing the details of this interface.

This document describes the EGS Elements interface to EDOS; that is, the requirements common to all EGS-supported elements receiving data from EDOS.

Complements to this document are the EDOS Data Format Requirements Document (DFRD) and the EDOS-EGS Elements ICD. They define the contents and formats of the data products exchanged as part of the EDOS-to-EGS Elements interface.

This IRD defines the EDOS - EGS Elements interface for the EOS missions. This IRD will be modified as necessary to describe future changes to the EDOS - EGS Elements interface.

- **IRD between EDOS and EMSn [423-EDOS-0211.0004R3]**

This document presents the requirements for the interface between the Earth Observing System (EOS) Data and Operations System (EDOS), EOS Real-time Processing System (ERPS), and the EOS Mission Support Network (EMSn). EDOS, ERPS and EMSn are elements of the EOS Ground System (EGS).

This document is an incorporated part of the EDOS Functional and Performance Specification (F&PS). The purpose of this document is to provide further detail regarding the requirements for the interfaces described in the F&PS. The document will identify all functional and performance requirements describing the mission and operations management data to be exchanged as part of the interface. This document is intended to be a preliminary requirements document to support the development of a formal Interface Control Document (ICD) between EDOS and EMSn.

# 3. ECS Project System Releases, Descriptions and Protection

This section provides the system releases, the system descriptions and the security documents generated for use in the ECS. The ECS Contract Data Requirements Document (CDRD) is the primary document from which almost all of the ECS Project deliverable documents have been produced. These are the Contract Data Requirements List (CDRL) items to be delivered under contract. The Contract Data Requirements Document (CDRD) is the requirement to produce all the items identified on the CDRD list. THE CDRD can be found at the http://romulus.gsfc.nasa.gov/docview/docfinder web site. The other documents listed below are found at the http://edhs1.gsfc.nasa.gov/database/ECSCatalog.html web site. Following are some of these documents and their purpose and contribution to the overall Earth Science Enterprise mission.

Figure 3-1 is the system descriptions, system releases and system security diagram. The diagram shows the documents, which provide the system descriptions, provides what is contained in system releases and the security documents governing the security of the ECS.

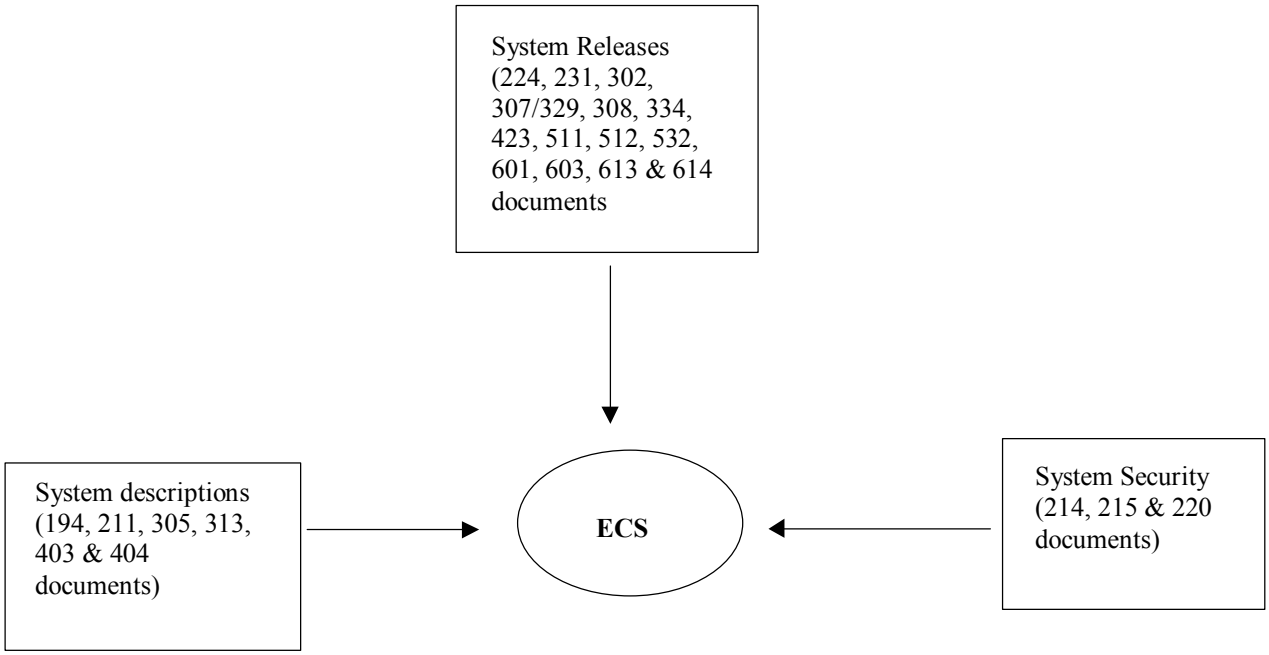


***Figure 3-1. System descriptions, releases and security***

## 3.1 EOSDIS Core System Contract Data Requirements Document

**[Document Number 423-41-03]**

The Contract Data Requirements Document (CDRD) is the basic contractual document, which governs all the data required by and for the contract. The Contractor shall furnish all data described by the Data Item Descriptions (DIDs) included herein and listed in the Contract Data Requirements List (CDRL). All data shall be prepared, maintained and delivered to NASA in accordance with the requirements of this CDRD. The CDRD does not specify all of the documents or activities the Contractor will have to accomplish to meet the objectives of the contract. This CDRD provides the top-level structure for the contract work and lists the reviews and documents of primary importance to the Government. The Contractor is to define the additional documents and reviews, which are appropriate for this contract.

### 3.1.1 System Releases

The ECS Project is responsible for ensuring there is Software Development and Release Planning to provide the information necessary for users to know what system capabilities are being provided for each release of software for the project. The Software Development Plan has been supplemented by the System Science Release plan for each release. Following is the description of various Release specific documents, the Software Development Plans, and Science System Release Plans.

- **Release B Release Plan for the ECS Project [Document Number 224-CD-001]**

This Release B Release Plan for the ECS Project fulfills Contract Data Requirements List (CDRL) item 145 and Data Item Description (DID) 224/SE2 as proposed in ESDIS Configuration Change Request (CCR) 505-01-41-035C. When the CCR is approved, this document will be required a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract NAS5-60000.

This document is intended to provide a high-level and easily accessible description of newly defined releases B.0 and B.1 of the ECS Project. It summarizes the system requirements for each of these releases as expressed in authorized Level 3 requirements and interface requirements for the ECS project. It is not intended to be a technical reference to those requirements. It does not address the project's Level 4 requirements or design implementation.

This Release B Release Plan captures the results of the ECS Release B re-planning effort. It lists the ECS Functional capabilities and services to be delivered under contract NAS5-60000 in the newly defined Releases b.0 and B.1. It documents which capabilities will be delivered with Release B.0 and which capabilities will then be added to Release B.0 to create Release B.1.

- **Release B GSFC Facility Plan for the ECS Project [Document Number 302-CD-003]**

This plan is prepared to inform the host site of the approximate requirements for the ECS Release B systems. The Release B systems are in support of the AM-1 and Landsat missions whereas Release A systems are in support of the TRMM mission. For ease of identifying column headings in tables, the release designation is used in place of the NASA project names.

The requirements contained in this plan (e.g., space, power and cooling) are based on the quantities and types of equipment described in the Release B design specification (i.e., CDRL 305) submitted for the April '96 Release B Critical Design Review (CDR). The quantities, makes and/or models may change somewhat by the time Release B equipment is delivered, dependent on decisions reached during and after CDR. Sites scheduled to receive equipment at Release B include Goddard Space Flight center (GSFC), Langley Research Center (LaRC), EROS Data Center (EDC), Alaska SAR Facility (ASF), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC) and Oak Ridge National Laboratory (ORNL).

- **Release B LaRC Facility Plan for the ECS Project [Document Number 302-CD-004]**

This plan is prepared to inform the host site of the approximate requirements for the ECS Release B systems. The Release B systems are in support of the AM-1 and Landsat missions whereas Release A systems are in support of the TRMM mission. For ease of identifying column headings in tables, the release designation is used in place of the NASA project names.

The requirements contained in this plan (e.g., space, power and cooling) are based on the quantities and types of equipment described in the Release B design specification (i.e., CDRL 305) submitted for the April '96 Release B Critical Design Review (CDR). The quantities, makes and/or models may change somewhat by the time Release B equipment is delivered, dependent on decisions reached during and after CDR. Sites scheduled to receive equipment at Release B include Goddard Space Flight center (GSFC), Langley Research Center (LaRC), EROS Data Center (EDC), Alaska SAR Facility (ASF), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC) and Oak Ridge National Laboratory (ORNL).

- **Release B EDC Facility Plan for the ECS Project [Document Number 302-CD-005]**

This plan is prepared to inform the host site of the approximate requirements for the ECS Release B systems. The Release B systems are in support of the AM-1 and Landsat missions whereas Release A systems are in support of the TRMM mission. For ease of identifying column headings in tables, the release designation is used in place of the NASA project names.

The requirements contained in this plan (e.g., space, power and cooling) are based on the quantities and types of equipment described in the Release B design specification (i.e., CDRL 305) submitted for the April '96 Release B Critical Design Review (CDR). The quantities, makes and/or models may change somewhat by the time Release B equipment is delivered, dependent on decisions reached during and after CDR. Sites scheduled to receive equipment at Release B include Goddard Space Flight center (GSFC), Langley Research Center (LaRC), EROS Data Center (EDC), Alaska SAR Facility (ASF), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC) and Oak Ridge National Laboratory (ORNL).

- **Release B NSIDC Facility Plan for the ECS Project [Document Number 302-CD-006]**

This plan is prepared to inform the host site of the approximate requirements for the ECS Release B systems. The Release B systems are in support of the AM-1 and Landsat missions whereas Release A systems are in support of the TRMM mission. For ease of identifying column headings in tables, the release designation is used in place of the NASA project names.

The requirements contained in this plan (e.g., space, power and cooling) are based on the quantities and types of equipment described in the Release B design specification (i.e., CDRL 305) submitted for the April '96 Release B Critical Design Review (CDR). The quantities, makes and/or models may change somewhat by the time Release B equipment is delivered, dependent on decisions reached during and after CDR. Sites scheduled to receive equipment at Release B include Goddard Space Flight center (GSFC), Langley Research Center (LaRC), EROS Data Center (EDC), Alaska SAR Facility (ASF), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC) and Oak Ridge National Laboratory (ORNL).

- **Release B JPL Facility Plan for the ECS Project [Document Number 302-CD-007]**

This plan is prepared to inform the host site of the approximate requirements for the ECS Release B systems. The Release B systems are in support of the AM-1 and Landsat missions whereas Release A systems are in support of the TRMM mission. For ease of identifying column headings in tables, the release designation is used in place of the NASA project names.

The requirements contained in this plan (e.g., space, power and cooling) are based on the quantities and types of equipment described in the Release B design specification (i.e., CDRL 305) submitted for the April '96 Release B Critical Design Review (CDR). The quantities, makes and/or models may change somewhat by the time Release B equipment is delivered, dependent on decisions reached during and after CDR. Sites scheduled to receive equipment at Release B include Goddard Space Flight center (GSFC), Langley Research Center (LaRC), EROS Data Center (EDC), Alaska SAR Facility (ASF), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC) and Oak Ridge National Laboratory (ORNL).

- **Release B ASF Facility Plan for the ECS Project [Document Number 302-CD-008]**

This plan is prepared to inform the host site of the approximate requirements for the ECS Release B systems. The Release B systems are in support of the AM-1 and Landsat missions whereas Release A systems are in support of the TRMM mission. For ease of identifying column headings in tables, the release designation is used in place of the NASA project names.

The requirements contained in this plan (e.g., space, power and cooling) are based on the quantities and types of equipment described in the Release B design specification (i.e., CDRL 305) submitted for the April '96 Release B Critical Design Review (CDR). The quantities, makes and/or models may change somewhat by the time Release B equipment is delivered, dependent on decisions reached during and after CDR. Sites scheduled to receive equipment at Release B include Goddard Space Flight center (GSFC), Langley Research Center (LaRC), EROS Data Center (EDC), Alaska SAR Facility (ASF), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC) and Oak Ridge National Laboratory (ORNL).

- **Release B ORNL Facility Plan for the ECS Project [Document Number 302-CD-009]**

This plan is prepared to inform the host site of the approximate requirements for the ECS Release B systems. The Release B systems are in support of the AM-1 and Landsat missions whereas Release A systems are in support of the TRMM mission. For ease of identifying column headings in tables, the release designation is used in place of the NASA project names.

The requirements contained in this plan (e.g., space, power and cooling) are based on the quantities and types of equipment described in the Release B design specification (i.e., CDRL 305) submitted for the April '96 Release B Critical Design Review (CDR). The quantities, makes and/or models may change somewhat by the time Release B equipment is delivered, dependent on decisions reached during and after CDR. Sites scheduled to receive equipment at Release B include Goddard Space Flight center (GSFC), Langley Research Center (LaRC), EROS Data Center (EDC), Alaska SAR Facility (ASF), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC) and Oak Ridge National Laboratory (ORNL).

- **Science Data Processing Segment Release and Development Plan for the ECS Project [Document Numbers 307-CD-002/329-CD-002]**

This document is submitted as required by CDRL items 048, DID 307/DV2 and 058, DID 329/DV2, as specified in the Statement of Work, as a deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract NAS5-60000.

This plan orchestrates the procedures defined in the ECS Software Development Plan, CDRL # 049, DID 308, into release-specific, development plans of schedule providing guidance in the preparation of the detailed planning necessary to ensure a graceful transformation from the design and prototyping activities into tangible end items ready for system integration and test. It identifies the Configuration Items (CIs) and their components; defines the resources required for component development; details the schedule for development, by release, and provides the mapping of components to be integrated into the builds planned for deployment by release at the ECS segment level. Specific details of the component development, coding standards, integration and test, and related items can be found in the supporting documentation listed in Section 2.2, Applicable Documents.

This document describes the plan for development of the CIs and components of the Science Data Processing Segment (SDPS) of the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS). The ECS is deployed as a series of releases, each providing additional functionality, in support of scheduled key EOSDIS element deployment, and performance enhancements, as planned technologies mature. Each release contains a subset of the functionality specified in the ECS Functional and Performance Requirements Specification (F&PRS) with the final ECS release containing all of the functionality specified for the program. This version of the SDPS Development/Release Plan includes details of the SDPS development for Interim Release 1 (IR-1) of the ECS. Subsequent versions are planned for release at the Incremental Design Reviews (IDRs) for Release B through D.

This document reflects the Technical Baseline submitted via contract correspondence number ECS 194-00343.

- **Communications and Systems Management Segment (CSMS) Release and Development Plan for the ECS Project [Document Numbers 307-CD-003/329-CD-003]**

The Communications and System Management Segment (CSMS) Release and Development Plan for the ECS Project, Contract Data Requirement List (CDRL) items 048 and 058, with requirements specified in the Data Item Descriptions (DIDs) 307/DV2 and 329/DV2 is a

required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract NAS5-60000.

This plan orchestrates the procedures defined in the ECS Software development Plan, CDRL # 049, DID 308, into release-specific, development plans of schedule providing guidance in the preparation of the detailed planning necessary to ensure a graceful transformation from the design and prototyping activities into tangible end items ready for system integration and test. It identifies the Configuration Items (CIs) and their components; defines the resources required for component development; provides schedule templates for development, by release, and provides the mapping of components to builds by release at the ECS segment level. Specific details of the component development, coding standards, integration and test, and related items can be found in the supporting documentation listed in Section 2.2, Applicable Documents.

This document describes the plan for development of the CIs and components of the Communications and Systems Management Segment (CSMS) of the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS). The ECS is deployed as a series of releases, each providing additional functionality, in support of scheduled key EOSDIS element deployment, and performance enhancements, as planned technologies mature. Each release contains a subset of the functionality specified in the ECS Functional and Performance Requirements Specification (F&PRS) with the final ECS release containing all of the functionality specified for the program. This version of the CSMS Development/Release Plan includes details of the CSMS development for Interim Release 1 (IR-1) of the ECS. Subsequent versions are planned for release at the IDRs for Release B through D.

This document reflects the Technical Baseline submitted via contract correspondence number ECS 194-00343.

- **Release B Science Data Processing Segment Release and Development Plan for the ECS Project [Document Numbers 307-CD-004/329-CD-004]**

This document is submitted as required by Contract Data Requirements List (CDRL) items 048, DID 307/DV2 and 058, DID 329/DV2, as specified in the Statement of Work, as a deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract NAS5-60000.

This plan orchestrates the procedures defined in the ECS Software development Plan, CDRL # 049, DID 308, into release-specific, development plans of schedule providing guidance in the preparation of the detailed planning necessary to ensure a graceful transformation from the design and prototyping activities into tangible end items ready for system integration and test. It identifies the Configuration Items (CIs) and their components; defines the resources required for component development; provides schedule templates for development, by release, and provides the mapping of components to builds by release at the ECS segment level. Specific details of the component development, coding standards, integration and test, and related items can be found in the supporting documentation listed in Section 2.2, Applicable Documents.

This document describes the plan for development of the Configuration Items and components of the Science Data Processing Segment (SDPS) of the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS). The ECS is deployed as a series of releases,

each providing additional functionality, in support of scheduled key EOSDIS element deployment, and performance enhancements, as planned technologies mature. Each release contains a subset of the functionality specified in the ECS Functional and Performance Requirements Specification (F&PRS) with the final ECS release containing all of the functionality specified for the program. This version of the SDPS Release/ Development Plan includes details of the initial SDPS development for Interim Release 1 (IR-1) and Release B of the ECS. Subsequent versions are planned for release at the Incremental Design Reviews for Release C and D.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **Communications and Systems Management Segment (CSMS) Release and Development Plan for the ECS Project [Document Numbers 307-CD-005/329-CD-005]**

The Communications and System Management Segment (CSMS) Release and Development Plan for the ECS Project, Contract Data Requirements List (CDRL) items 048 and 058, with requirements specified in the Data Item Descriptions (DIDs) 307/DV2 and 329/DV2 is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract NAS5-60000.

This plan orchestrates the procedures defined in the ECS Software Development Plan, CDRL # 049, DID 308, into release-specific, development plans of schedule providing guidance in the preparation of the detailed planning necessary to ensure a graceful transformation from the design and prototyping activities into tangible end items ready for system integration and test. It identifies the Configuration Items (CIs) and their components; defines the resources required for component development; provides schedule templates for development, by release, and provides the mapping of components to builds by release at the ECS segment level. Specific details of the component development, coding standards, integration and test, and related items can be found in the supporting documentation listed in Section 2.2, Applicable Documents.

This document describes the plan for development of the CIs and components of the Communications and Systems Management Segment (CSMS) of the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS). The ECS is deployed as a series of releases, each providing additional functionality, in support of scheduled key EOSDIS element deployment, and performance enhancements, as planned technologies mature. Each release contains a subset of the functionality specified in the ECS Functional and Performance Requirements Specification (F&PRS) with the final ECS release containing all of the functionality specified for the program. This version of the CSMS Development/Release Plan includes details of the CSMS development for Interim Release 1 (IR-1) of the ECS. Subsequent versions are planned for release at the IDRs for Release B through D.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **SDPS Software Development Plan for the ECS Project [Document Number 308-CD-001]**

This Software Development plan (SDP), Contract Data Requirements List (CDRL) item 049, whose requirements are specified in Data Item Description (DID) 308/DV2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The ECS SDPS SDP describes the processes the ECS SDPS project will use to develop and document the ECS SDPS software. It provides a systematic approach to software development, using NASA Software Documentation Standard, NASA-STD-2100-91, to tailor those software engineering practices to specifically meet ECS SDPS needs. The plan is used by the Government to monitor the procedure management and contract work effort of the organizations performing software development.

The Raytheon Systems Company (RSC) processes, Integrated Product Development System (IPDS), Software Operating Instructions (SOIs) and Raytheon ITS processes were used to generate the process documented in this plan. By using RSC standard tailoring procedures, ECS SDPS was able to generate this process quickly. The RSC tailoring process provided an easy way to identify where ECS SDPS processes fit in an overall system development process.

The ECS SDPS SDP outlines the steps by which the development of ECS SDPS software will be accomplished and the management approach to software development. The SDP addresses software processes, products, methods, organizational responsibilities, tools, configuration management, software quality and other activities relevant to accomplishment of the ECS statement of work. Overall, the plan for ECS SDPS software development consists of several documents:

- The ECS SDPS SDP - discusses software development processes at a summary level
- ITS policies and directives (available on the Raytheon ITS web page) - prescribes practices that apply to the Raytheon ITS business unit
- ECS Project Instructions (PIs) and Work Instructions (WIs) (available on the ECS Internal Server) - provide details of ho Development and other processes on the ECS project are executed
- Related Project Documentation (listed in Section 2 of this document) - provide additional information about the ECS Project, the software product and related processes
- Baselined schedules and budgets maintained for the ECS Project (available from the Program Office or Program Controls Department) - provide up to date status regarding the cost and schedule of software products under development

These documents are applicable to all software development processes and standards on the ECS SDPS project unless a formal waiver identifying any deviation or exception is documented and approved. Note that ECS PIs and WIs take precedence over ITS policies and directives since the

ECS PIs reflect the tailoring of IPDS and Raytheon SOIs to the ECS Program, as well as specific contractual obligations.

- This document discusses software development processes at a summary level

This plan addresses the processes used by the ECS Science and Data processing Segment project. It covers the life cycle and process for all the ECS SDPS releases. The EMOS has a different software development life cycle and is not addressed as part of this plan.

- **Release B Maintainability Demonstration Plan for the ECS Project [Document Number 511-CD-002]**

This document, Contract Data Requirements List (CDRL) item 084, whose requirements are specified in Data Item Description (DID) 511/PA1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The Maintainability Demonstration (MD) Plan presents the requirements and defined objectives for conducting MD tests of ECS COTS hardware. The maintainability environment maintenance approach for Release B and system level RMA requirements are discussed. The plan outlines proposed failure scenarios that meet the defined MD objectives and map directly to existing Acceptance Test (AT) test cases and procedures in the Acceptance Test demonstration.

This document applies to commercial-off-the-shelf (cots) hardware selected, procured, integrated and tested for an operational ECS release. The Plan will be revised in the event of custom hardware, but ECS is not planning to develop any custom hardware. This plan also does not apply to the maintainability of ECS developed or COTS software. This plan proposes Maintainability Demonstration (MD) failure scenarios that meet defined MD objectives. Candidate failure scenarios are mapped into existing acceptance test cases. The ECS COTS hardware has been designed to commercial maintainability standards and support practices. Therefore, these MD scenarios do not verify unit level COTS Mean Time to Repair (MTTR) or commercial maintainability design. This document is updated for Release B Test Readiness Review (TRR).

Release B provides archive and distribution services for the Landsat-7 and COLOR missions and product generation support for COLOR.

This document reflects the February 7, 1996 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS Technical Direction # 11, dated December 6, 1994.

- **Release B Maintainability Demonstration Test Plans for the ECS Project [Document Number 512-CD-002]**

This document, Contract Data Requirements List (CDRL) item 085, whose requirements are specified in Data Item Description (DID) 512/PA1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The Maintainability Demonstration (MD) Test Plans restate the requirements and objectives for conducting MD tests of ECS COTS hardware. The test plans attached are based upon accepted DID 511 MD failure scenarios for Release B that meet the defined MD objectives and utilize planned Acceptance Test and System Verification test procedures. The test plans describe testing requirements, methodology and step-by-step procedure, expected results and success criteria. The Science and MSS Failover test plans are not complete as of this submission and subject to further change and red-lines as a result of dry run or formal testing. The FOS Failure Recovery and Status Monitoring test plan was delivered in the previous submission of DID 512 and is being updated and revised.

This document is based upon DID 511 and applies to COTS hardware selected, procured, integrated and tested for an operational ECS Release. The MD Plan DID 511 will be revised in the event of developing custom hardware, but ECS is not planning to develop any custom hardware. The MD plan does not apply to the maintainability of ECS-developed or COTS software. The ECS COTS hardware has been designed to commercial maintainability standards and support practices. Therefore, these MD tests plans do not verify unit level COTS Mean Time to Repair (MTTR) or commercial maintainability design. This submission identifies the test plans currently in the Acceptance Test and System Verification schedule that support the MD scenarios and the Ingest and MSS Fail-over test plans under development.

This document reflects the February 7, 1996 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS Technical Direction # 11, dated December 6, 1994.

- **Release B Environmental Control Plan for the ECS Project [Document Number 532-CD-002]**

This document, Contract Data Requirements List (CDRL) item 105, whose requirements are specified in Data Item Description (DID) 532/PA1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document is published as the Environmental Control Plan for Release B. It substantiates the temperature and humidity environmental requirements specified in the Facilities Plans for Release B. The plan discusses applicable environmental factors and describes the controls appropriate for Release B COTS hardware and software storage media. COTS vendor specified operating temperature and humidity ranges are provided for those products identified and known at this time.

This document reflects the CDR-B hardware design based on the February 14, 1996 Technical Baseline. This baseline is maintained by the contractor Configuration Control Board (CCB) in accordance with ECS Technical Direction #11, dated December 6, 1994.

- **Maintenance and Operations Management Plan for the ECS Project [Document Number 601-CD-001]**

This document is submitted as Contract Data Requirements List (CDRL), item 109, DID 601/OP1 under contract NAS5-60000.

The Earth Observing System (EOS) Data and Information System (EOSDIS), as the National Aeronautics and Space Administration's (NASA) overall Earth Science discipline data system, provides the ground system for the collection and analysis of science data to support scientists in resolving the dynamics of the Earth's components and the processes by which they interact. As a part of the EOS Program, EOSDIS supports: the planning, scheduling and control of the EOS series of spacecraft; exchanging commands, data and algorithms with the European Space Agency (ESA), Japan, Canada, the National Oceanic and Atmospheric Administration (NOAA), and any other non-NASA entities involved in the overall EOS mission; the coordination of these activities with other data gathering systems; and the transformation of the observations into physical variables, providing for higher levels of processing and presenting the data to users in forms that facilitate and stimulate interactive scientific research. The portion of EOSDIS addressed in this document is the EOSDIS Core System (ECS).

The ECS is based on he functional and performance capabilities required by the baseline EOSDIS design. The ECS provides support for the EOS Services spacecraft and instruments. ECS also provides information management, data archive and data distribution functions for all other NASA Earth Science flight missions, NASA Earth science instruments flown on non-NASA flight missions, and for other NASA held Earth Science data.

This document is based on the ECS Change Order 1 list of locations and Statement of Work. ECS elements are deployed to the institutions shown below:

- Distributed Active Archive Centers (DAACs):
  - Alaska SAR Facility (ASF) -- University of Alaska - Fairbanks, Alaska
  - EROS Data Center (EDC) -- Sioux Falls, South Dakota
  - Goddard Space Flight Center (GSFC) -- Greenbelt, Maryland
  - Jet Propulsion Laboratory (JPL) -- Pasadena, California
  - Langley Research Center (LaRC) -- Hampton, Virginia
  - Marshall Space Flight Center (MSFC) -- Huntsville, Alabama
  - National Snow and Ice Data Center (NSIDC) -- University of Colorado, Boulder, Colorado
  - Oak Ridge National Laboratory (ORNL) -- Oak Ridge, Tennessee
- System Monitoring and Coordination Center (SMC) -- GSFC Building 32
- EOS Operations Center (EOC) -- GSFC Building 32
- ECS Sustaining Engineering Organization (SEO) -- GSFC Building 32
- ECS System Integrated Logistics Support Organization (ILS) -- GSFC Building 32

This plan addresses management of the maintenance and operations (M&O) hardware, software and personnel resources of ECS deployed to these locations.

This document reflects the Technical Baseline submitted via contract correspondence number ECS 194-00343.

- **ECS Operational Readiness Plan for Release 2.0 [Document Number 603-CD-003]**

This Operational Readiness Plan, CDRL item 111, whose requirements are specified in Data Item Description DID 603/OP1, is a required deliverable under the EOSDIS Core System (ECS) contract NAS5-60000. This is the initial submittal of this document.

This Operational Readiness Plan identifies those activities required to prepare the ECS for operation of the Release 2.0 Am-1 mission and to assure that all required ECS functions are on-line and in operational-ready status in preparation for an operational system event. It covers the schedule period from Release 2.0 Custom Software Turnover (CST) through the point of declaring ECS ready for initial operations mission events for AM-1. That readiness point is termed the ECS Release 2.0 Operations Readiness Review (ORR) and is a prerequisite to ECS participation in AM-1 Mission Readiness activities.

Activities within the preparation and operational readiness periods are performed by several organizations as introduced in Table 1-1, ECS Release 2.0 Organizational Participation by OR Activity and defined in more detail later in the plan.

This plan identifies and describes the activities required to prepare, verify and review the operational readiness of all ECS Release 2.0 Maintenance and Operations staff, procedures, hardware, software and databases for AM-1 operations support. The relationship, roles and responsibilities of all organizations participating in parts of this necessarily cooperative effort are explicitly established.

- **ECS Operational Readiness Plan for the PM-1/Aqua Mission [Document Number 603-CD-005]**

This Operational Readiness Plan, CDRL item 111, whose requirements are specified in Data Item Description DID 603/OP1, is a required deliverable under the EOSDIS Core System (ECS) contract NAS5-60000. This is the initial submittal of this document for the PM-1/Aqua mission.

This Operational Readiness Plan identifies those activities required to prepare the ECS for operation of the PM-1 mission and to assure that all required ECS functions are on-line and in operational-ready status in preparation for an operational system event. It covers the schedule period from Release 5A to 5B transition through the point of declaring ECS ready [Launch Readiness decision (LRD)] for initial operations mission events for PM-1/Aqua. That readiness point review is termed the ECS PM-1/Aqua Operations Readiness Review (ORR) and is a prerequisite to ECS participation in PM-1 Mission Readiness activities.

Because extensive planning coordination and documentation is underway to support the Transition from Release 5A to 5B, which happens to be coincident with preparations for DAAC/SMC Aqua Operational readiness, this M&O authored document will present a high level view of the Operational Readiness Plan. This cost-effective approach will avoid double documentation, keep the authority for planning with the responsible ESDIS Programmatic Elements and yet provide the reader with a sense of the overall plan.

Activities within the preparation and operational readiness periods are performed by several organizations as introduced in section 3.1.2, EGS Integration and Test and defined in more detail later in the plan by specific sites (GSFC, EDC, LaRC, and NSIDC DAACs and the SMC).

This plan identifies and describes the activities required to prepare, verify and review the operational readiness of all ECS Release 2.0 Maintenance and Operations staff, procedures, hardware, software and databases for PM-1 operations support. The relationship, roles and responsibilities of all organizations participating in parts of this necessarily cooperative effort are explicitly established.

- **Release B COTS Maintenance Plan for the ECS Project [Document Number 613-CD-003]**

This document, Contract Data Requirements List (CDRL) item 119, whose requirements are specified in Data Item Description (DID) 613/OP1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document describes the general concept and plan for maintaining ECS Commercial-Off-The-Shelf (COTS) hardware (HW) and software (SW) in support of ECS objectives. It is applicable to the maintenance support of ECS COTS HW and SW from initial product installation until maintenance responsibility is transferred to NASA or its designated follow-on maintenance contractor. This document describes the responsibilities of the ECS contractor, original equipment manufacturers and third party maintenance contractors in providing maintenance support to the ECS project.

This document applies to all COTS HW and SW supplied by the ECS Contractor. It defines the responsibilities of the Ecs Project organization for the maintenance of COTS products at seven Release B distributed active archive centers (DAACs), EOS Operations Center (EOC), System Monitoring and Coordination Center (SMC) and the ECS Development Facility (EDF). This document lays the foundation for implementing and managing the COTS HW and SW maintenance for the ECS during Release B.

This document reflects the February 14, 1996 Technical Baseline maintained by the contractor configuration control board in accordance with Ecs Technical Direction Number 11, dated December 6, 1994.

- **Developed Software Maintenance Plan for the ECS Project [Document Number 614-CD-001]**

This document, Contract Data Requirements List (CDRL) item 120, whose requirements are specified in Data Item Description (DID) 614/OP1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document describes the general concept and plan for maintaining developed software in support of ECS objectives. This plan is applicable to maintenance support of ECS developed software from initial product installation until maintenance responsibility is transferred to NASA

or its designated follow-on maintenance contractor. This document describes the responsibilities of the ECS contractor in providing developed software maintenance support to the ECS project.

This document applies to all developed software supplied by the ECS Contractor. It defines the responsibilities of the ECS Project organization for the maintenance of developed software products at the Distributed Active Archive Centers (DAACs), EOS Operations Center (EOC), System Monitoring and Coordination Center (SMC) and coordination with the ECS Development Facility (EDF). This document lays the foundation for performing and managing the developed software maintenance for the ECS. Generally stated, developed software maintenance entails acceptance and integration of on-site maintenance changes to ECS software; to produce, deliver and document system-wide corrections, modifications and enhancements made to ECS software; and/or to adapt or incorporate any software for ECS use. Software configuration management is only discussed as it relates to software maintenance problem resolution, version/update and change control.

The maintenance of science software and data items provided by the Science Computing Facilities (SCFs) is not the responsibility of the Ecs on-site maintenance engineers. Problem resolutions and changes to science software sponsored by the SCFs shall be introduced under the auspices of local DAAC configuration management activities and the Earth Science Data and Information System (ESDIS) (GSFC Code 505) CCB in the same manner as new releases to base-lined science software. On-site changes or updates shall be integrated and tested by the Science Software Team. Ongoing CM of ECS integrated science software will be accomplished by the same tool set used for ECS developed software as explained in Section 3.3 Standardization of Support Procedures under local DAAC control.

- **Earth Observing System Distributed Information System Core System (ECS) Product Distribution System (PDS) Program Plan [Document Number 231-TP-003]**

This technical paper describes the program baseline for the development and deployment of the Earth Observing System Distributed Information System Core System (ECS) Product Distribution System (PDS). The ECS PDS will provide enhanced physical media distribution capability at the EOSDIS DAACs for the Drop 5B.06+ baseline.

This technical paper provides program plans and schedules to provide guidance in preparation of the detailed planning necessary to ensure a graceful transformation from the design and prototyping activities into a tangible item ready for system integration and test. This paper describes the ECS PDS acquisition lifecycle from ESDIS concept formulation through deployment to the DAACs.

- **5A Science System Release Plan [Document Number 334-CD-001]**

This document is the 5A Science System Release Plan for the ECS Project, which is defined by Data Item Description (DID) 334/DV1.

The purpose of this plan is to provide the approach and road map of the ECS 5A system release. This plan describes the ECS' response to the requirements specified in Appendix B.

The 5A Science System Release Plan documents the ECS approach for completing the development of the SDPS Release 5A system. Mod 86, The ECS Restructure Proposal for Contract NAS560000 provides the basis for this plan. Activities such as the end to end test at NSIDC will be a subject for negotiation and have not been included in this plan. The 5A schedule incorporates "NAS560000, Delivery Schedule" letter dated May 14, 1999. This pan and the associated schedule will be revised, as required, based on the negotiations.

- **5B Science System Release Plan [Document Number 334-CD-510]**

This document is the 5B Science System Release Plan for the ECS Project, which is defined by Data Item Description (DID) 334/DV1.

The 5B Science System release Plan (SSRP) for the ECS Project documents the ECS approach for releasing the 5B Science System. This plan describes: the capabilities to be addressed by 5B; the process for defining requirements, designing, developing, integrating, verifying, reviewing, monitoring, and statusing all products defined under the Restructure Proposal for 5B; and the known issues and risks.

The purpose of this plan is to provide the approach for and road map to releasing the 5B system. This has been a working plan and, as necessary, it was updated to reflect the latest approved changes. This document is designed to complement the existing management tools such as Primavera.

The 5B Science System Release Plan documents the definition, implementation and development of the ECS SDPS Release 5B system. The scope of this plan is limited to 5B and covers the following items:

a. Capabilities to be developed

b. F&PRS requirements to be delivered

c. Approach to be used for NCR fixes and any known high priority NCRs planned to be delivered

d. Overall strategy for COTS upgrade

e. Build and drop/patch approach and known/scheduled drop/patch information

f. Customer reviews to be conducted

g. CDRLs to be delivered and/or updated

h. Approach to be used for requirements verification (test approach)

i. Schedule of key activities

j. Progress metrics

k. Risk mitigation plans and external drivers

Mod 86, the ECS Restructure Proposal for Contract NAS5-60000 provides the basis for this plan. The 5B schedule incorporates "NAS5-60000, Delivery Schedule" letter dated May 14,

1999. This plan and the associated schedule will be revised, as required, based on the negotiations.

- **6A Science System Release Plan [Document Number 334-CD-600]**

This document is the fourth and final version of the 6A Science System Release Plan for the ECS Project, which is defined by Data Item Description (DID) 334/DV1.

The 6A Science System release Plan (SSRP) for the ECS Project documents the ECS approach for releasing the 6A Science System. This plan describes: the capabilities to be addressed by 6A (including 5BP); the process for defining requirements, designing, developing, integrating, verifying, reviewing, monitoring, and statusing all products defined under the Restructure Proposal for 6A; and the known issues and risks.

The purpose of this plan is to provide the approach for and road map to releasing the 6A system. This has been a working plan and, as was necessary, it was updated to reflect the latest approved changes up to CSR. This document is designed to complement the existing management tools such as Primavera.

The 6A Science System Release Plan documents the definition, implementation and development of the ECS SDPS Release 6A system. The scope of this plan covers 6A and 5BP releases and covers the following items:

a. Capabilities to be developed

b. F&PRS requirements to be delivered

c. Approach to be used for NCR fixes and any known high priority NCRs planned to be delivered

d. Overall strategy for COTS upgrade

e. Build and drop/patch approach and known/scheduled drop/patch information

f. Customer reviews to be conducted

g. CDRLs to be delivered and/or updated

h. Approach to be used for requirements verification (test approach)

i. Schedule of key activities

j. Progress metrics

k. Risk mitigation plans and external drivers

Mod 86, the ECS Restructure Proposal for Contract NAS5-60000 provides the basis for this plan. This plan and the associated schedule will be revised, as required, based on the negotiations.

- **6B Science System Release Plan [Document Number 334-CD-610]**

This document provides the 6B Science System Release Plan for the ECS Project, which is defined by Data Item Description (DID) 334/DV1.

The 6B Science System release Plan (SSRP) for the ECS Project documents the ECS approach for releasing the 6B Science System. This plan describes: the capabilities to be addressed by 6B; the process for defining requirements, designing, developing, integrating, verifying, reviewing, monitoring, and statusing all products defined under the Restructure Proposal for 6B; and the known issues and risks.

The purpose of this plan is to provide the approach for and road map to releasing the 6B system. This has been a working plan and, as it becomes necessary, it will be updated to reflect the latest approved changes. This document is designed to complement the existing management tools such as Primavera.

The 6B Science System Release Plan documents the definition, implementation and development of the ECS SDPS Release 6B system. Release 6B is the last planned release for ECS under the current contract. The scope of this plan is limited to 6B and covers the following items:

a. Capabilities to be developed

b. F&PRS requirements to be delivered

c. Approach to be used for NCR fixes and any known high priority NCRs planned to be delivered

d. Overall strategy for COTS upgrade

e. Build and drop/patch approach and known/scheduled drop/patch information

f. Customer reviews to be conducted

g. CDRLs to be delivered and/or updated

h. Approach to be used for requirements verification (test approach)

i. Schedule of key activities

j. Progress metrics

k. Risk mitigation plans and external drivers

The ECS Restructure Proposal for Contract NAS5-60000 provides the basis for this plan. This plan and the associated schedule will be revised, as required, based on the negotiations.

### 3.1.2 System Descriptions

The ECS Project is responsible for providing documentation to describe the system being developed and how it operates to provide the data and services requested by the science

community users. The ECS Project has developed documents to provide information about the hardware and software subsystems of the project and internal software interfaces within the subsystems. Following are the documents used to describe the system architecture and internal interfaces based on the instruments supported by the planned missions.

- **System Design Specification for the ECS Project [Document Number 194-207-SEI]**

This document describes a system design that meets all the functional capabilities described in the ECS Requirements Specification (216/SEI). In addition, the system architecture is inherently evolvable to accommodate new services such as multi-media collaborative environment, heterogeneous operating systems, and dynamically adding and subtracting data providers.

Performance of the System will be based on several considerations that have been documented in various technical directives or specifications. System architecture and sizing presented here can accommodate the storage and processing required to support the NASA/SPSO Products List which covers those Products out to the 1999 time frame (i.e., AM1, COLOR, TRMM, and Landsat). This time frame is sometimes referenced in this document as the Release B time frame. In addition, the architect presented here will accommodate growth by 2-times Data Storage and 8-times (CPU) Data Processing. The system architecture is also evolvable to accommodate growth of Products and control of spacecraft beyond AM1. This document will define the high level components comprising the architecture as well as the potential classes of commercial off the shelf (COTS) hardware and software to be used. Then functional, performance, and capacity requirements of the system design will be described and allocated.

The System Design presented here is decomposed to the level of Segments and their attendant Subsystems (i.e., Configuration Items – CIs). Each subsystem is composed of HWCIs, CSCIs as well as Operational Elements, and related Information Architecture. Each subsystem is described in terms of their CIs and their decomposed services, which are traced to individual requirements of 216/SE1 in Appendices A & B of this document. Each CSCI is described in detail. Each HWCI or CSCI is described at a level of detail based on the need for specifying a COTS solution and/or a list of candidate COTS; long lead COTS selection occurring at PDR. Lower level of detail than required for the SDR may be presented herein at the discretion of the Segment designers for improved clarity of presentation. Finally, a number of working assumptions was made during the design; these are documented in Appendix C.

This document captures the results of the System Analysis Phase of the ECS Project. This phase describes the Functional Baseline and summarizes the project-wide requirements for the ECS. It is the first step in allocating the ECS Requirements Specification (216/SE1) to an evolvable System design. System evolvability, as defined in the System Engineering Plan (201/SE1), requires that the design architecture described here accommodate change. To this end, certain elements of the system are defined to the level of detail necessary to allow delayed implementation, in order to maximize application of the latest techniques and technologies to a chosen implementation scheme.

This document responds to the functional requirements identified in 216/SE1, with the exception of the Landsat 7 related requirements. The Landsat 7 operations concept has changed. This document does not reflect the new concept for Landsat 7.

- **Release B Trade-off Studies Analytical Data [Document Number 211-CD-002]**

This document, Trade-off Studies Analysis Data for the ECS Project: IDR, is submitted as required by Contract Data Requirements List item 031 and Data Item Description (DID) 211/SE3 under NASA contract NAS5-60000. This document supplements Trade-off Studies Analysis Data for the ECS Project (211-CD-001-002) that was delivered in support of the ECS PDR.

The purpose of this document is to present the status of the trade-off studies that support Release B design decisions. This document supplements, but does not replicate, the detailed information on trade-off studies contained in Trade-off Studies Analysis Data for the ECS Project (211-CD-001-002) (PDR). A majority of the trade-off studies included in 211-CD-001-002 (PDR) have been closed and, as available, this document includes references to the white papers and technical papers that document the results of closed studies. The studies included in 211-CD-001-002 (PDR) that remain active are identified in this document as "on-going" in the Release B time frame.

In addition, this document includes descriptions and status of new studies pertinent to IDR. In conjunction with the studies included in 211-CD-001-002 (PDR), the new IDR studies support the generation of the Release B Segment level requirements and the preliminary design.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B Verification Specification for the ECS Project [Document Number 403-CD-002]**

This document is submitted as required by CDRL item 065, DID 403, whose requirements are specified in this document as a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract (NAS5-60000).

The purpose of the ECS Verification Specification document is to identify the verification methods and assigned tests used by Release Integration and Test (I&T), Flight Operation Segment (FOS) and Acceptance, to verify each requirement. This document includes a description of the Requirements and Traceability Management (RTM) tool employed to trace requirements and matrix tables containing the requirements that must be met in Release B. These matrix tables include requirement identification, requirement text, assignment to requirement categories, identification of the verification methods discussed in greater detail in the ECS Verification Plan (DID 401), the Release Integration and Test Plans (SITP) test assignments and the Acceptance Test Plan (ATP) test assignments.

This document stipulates the specific portions or functions of the system requirements to be verified by each of the tests and analyses in Release B volumes of the ECS SITP (DID 402), the ATP (DID 409) and FOS Release Integration and Test Plan (DID 402). It also specifies the verification methods as discussed in the ECS Verification Plan (DID 401).

- **Procedure for Control of Unscheduled Activities During Verification for the ECS Project [Document Number 404-CD-001]**

This document is the Procedure for the Control of Unscheduled Activities during Verification. It is submitted as required for Data Item Description (DID) 404/VE1 for the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to establish procedures for controlling, documenting and approving all unscheduled activities occurring during the execution of Release Integration & Test (I&T) and Independent Acceptance Test Organization (IATO) test procedures. For the purpose of this document, unexpected occurrences are any anomalies or events interrupting the planned execution of test procedures or prevent the continuation of testing. Such occurrences include critical system performance anomalies; hardware, communications or power failures; or critical errors in the design or execution of test procedures. This document specifies a process by which the decision to proceed with testing can be made so as to minimize the impact of the flow of the overall verification process.

The procedures specified in this document are applicable to Release I&T and the IATO activities for the ECS. The roles, relationships and methodologies of the Release I&T and IATO test organizations are detailed in the Verification Plan for the ECS Project (194-401-VE1-002). Release I&T activities include the incremental integration of ECS components at the ECS Development Facility (EDF). Release I&T will verify level 3 and 4 functional requirements utilizing a build/thread methodology. ECS Acceptance Testing will be performed by the IATO at each of the ECS sites on fully configured ECS installations. IATO testing will execute realistic operational scenarios to verify level 3 functional and performance requirements and overall system operability. This document portrays the procedures to be followed by each of the two test groups when the planned course of test execution is interrupted by unscheduled and unexpected occurrences.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction number 11, dated December 6, 1994.

- **Release B SDPS/CSMS Design Specification for the ECS Project [Document Number 305-CD-020]**

This ECS Release B document (305-CD-020-001) for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV3 is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

This document, Release B Overview of the SDPS/CSMS Segment System Design Specification for the ECS Project supplies a basic overview for both the SDPS and CSMS segments of the ECS Project. It details the Release B components and discusses their relationship with external entities. It describes basic factors in development of these components and prepares the reader for the more detailed analyses of subsystem designs in the in-depth series of sub-documents that follow.

This document is intended to be read by all parties interested in the Release B design. For the casual reviewer, this document provides a good understanding of the ECS and Release B design. For those interested in an in-depth understanding of the design, this sub-document provides an integrated view of the subsystems as well as certain design concepts that span subsystems. It provides the context necessary for understanding of the subsequent documents.

The Release B Design Specification (DID 305/DV3) provides integrated design information of the SDPS and CSMS for Release B. It should be noted that the Flight Operations Segment (FOS) has provided its detailed design for the FOS CDR in separate documents.

The Release B design information is presented in a series of documents due to the volume of material provided. This document presents an overview of the detailed design for the SDPS and CSMS. It provides an overview of the Release B mission requirements and defines the SDPS and CSMS Computer Software and Hardware Configuration Items (CI), as well as the architectural design.

This document reflects the February 14, 1996 Technical Baseline (210-TP-001-006) maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B SDPS Client Subsystem Design Specification for the ECS Project [Document Number 305-CD-021]**

This Release B SDPS Client Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV3, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000. This publication is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B.

Release B provides support to EOS AM-1 Mission Operations and Science Operations and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B provides services for the Landsat 7, COLOR, ADEOS II, SAGE III, DAO, JERS-2, ERS-2, RADARSAT and RADARALT missions.

The Release B SDPS Client Subsystem Design Specification defines the progress of the design. It defines the Client Subsystem computer software design, as well as the subsystem design based on Level 4 requirements.

This subsystem is on an incremental development track. It is released and reviewed in the form of Evaluation Packages (EP), and is therefore not part of the formal Release B Critical Design Review. The overview material for these components has been included in this document for information purposes only.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B SDPS Interoperability Subsystem Design Specification for the ECS Project [Document Number 305-CD-022]**

This Release B SDPS Interoperability Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000. This publication is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B.

Release B provides support to EOS AM-1 Mission Operations and Science Operations and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B provides services for the Landsat 7, COLOR, ADEOS II, SAGE III, DAO, TERS, ERS, RADARSAT and ALT RADAR missions and it provides product generation support for COLOR.

The Release B SDPS Interoperability Subsystem Design Specification defines the progress of the Interoperability Subsystem design. It defines the Interoperability Subsystem computer software design, as well as the subsystem design based on Level 4 requirements.

This subsystem is on an incremental development track. It is released in and reviewed in the form of Evaluation Packages (EP), and is therefore, not part of the formal Release B Incremental Design Review. The overview material for this subsystem has been included in this document for information purposes only.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B SDPS Data Management Subsystem Design Specification for the ECS Project [Document Number 305-CD-023]**

This Release B SDPS Data Management Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000. This publication is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B.

Release B provides support to EOS AM-1 Mission Operations and Science Operations and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B provides services for the Landsat 7, COLOR, ADEOS II, SAGE III, DAO, TERS, ERS, RADARSAT and ALT RADAR missions and it provides product generation support for COLOR.

The Release B SDPS Data Management Subsystem Design Specification defines the progress of the design. It defines the Data Management Subsystem computer software and hardware architectural design, as well as the subsystem design based on Level 4 requirements.

This subsystem is on an incremental development track. It is released and reviewed in the form of Evaluation Packages (EP), and is therefore, not part of the formal Release B Critical Design Review. The overview material for this subsystem has been included in this document for information purposes only. Only the public interface classes and persistent database classes are defined in this document. Documentation requirements for the incremental development track are defined in the Systems Engineering Plan for the ECS Project (194-201-SEI-001).

This document reflects the February 14, 1996 Technical Baseline maintained by the contractor configuration control board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B SDPS Data Server Subsystem Design Specification for the ECS Project [Document Number 305-CD-024]**

This Release B SDPS Data Server Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000. This publication is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B.

The Release B Data Server Subsystem Design Specification defines the design of the subsystem. It defines the Data Server Subsystem computer software and hardware architectural design, in accordance with the ECS Level 4 requirements.

This document reflects the February 7, 1996 Technical Baseline maintained by the contractor configuration control board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B SDPS Ingest Subsystem Design Specification for the ECS Project [Document Number 305-CD-025]**

This Ingest Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), contract NAS5-60000. This publication is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B.

The Ingest Subsystem Design Specification defines the Release B detailed design of the Ingest Subsystem. It defines the Ingest Subsystem computer software and hardware architectural design, as well as the subsystem design based on Level 2 requirements.

This subsystem is on a formal development track. It is released in and reviewed at the formal Release B Critical Design Review.

This document reflects the February 7, 1996 Technical Baseline maintained by the contractor configuration control board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994 submitted via contract correspondence number ECS 194-00343.

- **Release B SDPS Planning Subsystem Design Specification for the ECS Project [Document Number 305-CD-026]**

This Release B SDPS Planning Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000. This publication is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B.

The Release B SDPS Planning Subsystem Design Specification defines the progress of the design. It defines the Planning Subsystem computer software and hardware architectural design, as well as the subsystem design based on Level 4 requirements.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B SDPS Data Processing Subsystem Design Specification for the ECS Project [Document Number 305-CD-027]**

This Release B SDPS Data Processing Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000. This publication is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B.

The Release B SDPS Data Processing Subsystem Design Specification defines the progress of the design. It defines the Data Processing Subsystem computer software and hardware architectural design, as well as the subsystem design based on Level 4 requirements.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS contractor configuration control board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B CSMS Communications Subsystem Design Specification for the ECS Project [Document Number 305-CD-028]**

This Release B CSMS Communications Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000. This publication is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B.

The Release B CSMS Communications Subsystem Design Specification defines the design. It defines the Communications Subsystem computer software and hardware architectural design, as well as the subsystem design based on Level 4 requirements.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B CSMS System Management Subsystem Design Specification for the ECS Project [Document Number 305-CD-029]**

This Release B Communications and System Management Segment (CSMS) Systems Management Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV3, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The Release B CSMS Systems Management Subsystem Design Specification defines the detailed design of the Systems Management Subsystem (MSS). It defines the Release B MSS architectural design, as well as the subsystem design based on Level 4 MSS requirements. This document will be updated for the Release Readiness Review to incorporate the as-built design of the MSS.

This document reflects the February 14, 1996 Technical Baseline maintained by the contractor control board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B GSFC DAAC Design Specification for the ECS Project [Document Number 305-CD-030]**

This Release B GSFC DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of

the GSFC DAAC in meeting its objectives. The Release B Overview of the SDPS and CSMS (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the reader in order to get a basic understanding of ECS design components. The Release Plan Content Description Document (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. While some DAAC configurations vary depending on the mission/capability requirements for ECS at their DAAC, the GSFC DAAC at full ECS capability will include all of the ECS science data processing and communications subsystems.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions
- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft
- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability
- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III (METEOR), and ACRIM FOO

Several of the driving requirements and milestones are initially supported by Release A but are expanded upon for Release B. For example, infrastructure Data Flow and end-to-end testing and simulation readiness testing are supported early-on by Release A, and will be fully supported by Release B during the final phases of testing. Likewise, V0 interoperability (one way) is supported by Release A for GSFC, LaRC, and EDC DAACs and is expanded to two-way interoperability for all DAACs at Release B.

ECS will provide support to eight DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These DAACs are located at: Goddard Space Flight Center (GSFC) in Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, Jet Propulsion Laboratory (JPL) Pasadena CA; the Consortium for International Earth

Science Information Network (CIESIN) in University Center, MI; and the Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks.

This document is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Control (SMC) center. A design specification for CIESIN since the ECS Contractor is not required to install, operate or maintain hardware and software at CIESIN.

This document specifically focuses on the GSFC DAAC ECS configuration and capabilities at Release B. It is released and reviewed at the formal Release B Critical Design Review.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

This document reflects the incorporation of elements previously identified as part of the Marshall Space Flight Center (MSFC) DAAC.

- **Release B Langley DAAC Design Specification for the ECS Project [Document Number 305-CD-031]**

This Release B Langley DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of the Langley DAAC in meeting its objectives. The Release B SDPS/CSMS Design Specification for the ECS Project (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the reader to get a basic understanding of ECS design components. The Release Plan Content Description for the ECS Project (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. While some DAAC configurations vary depending on the mission/capability requirements for ECS at their DAAC, the Langley DAAC at full ECS capability will include all of the ECS subsystems.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions

- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft
- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability
- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III (METEOR), and ACRIM FOO

Several of the driving requirements and milestones are initially supported by Release A but are expanded upon for Release B. For example, infrastructure Data Flow and end-to-end testing and simulation readiness testing are supported early-on by Release A, and will be fully supported by Release B during the final phases of testing. Similarly, V0 interoperability (one way) is supported by Release A for GSFC, LaRC, and EDC DAACs and is expanded to two-way interoperability for all DAACs at Release B.

ECS will provide support to eight DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These DAACs are located at: Goddard Space Flight Center (GSFC) Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, CO; Jet Propulsion Laboratory (JPL) Pasadena CA; the Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks and the Consortium for International Earth Science Information Network (CIESIN) located in Michigan.

This document is part of a series of documents comprising the Science and Communications Development Office (SCDO) design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Control (SMC) center.

This document specifically focuses on the Langley DAAC ECS configuration and capabilities at Release B. It is released and reviewed at the formal Release B Critical Design Review.

This document reflects the February 1996 Technical Baseline maintained by the contractor configuration board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B MSFC DAAC Design Specification for the ECS Project [Document Number 305-CD-032]**

This Release B MSFC DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV3, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of the MSFC DAAC in meeting its objectives. The Release B Overview of the SDPS and CSMS (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the reader to get a basic understanding of ECS design components. The Release Plan Content Description Document (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. While some DAAC configurations vary depending on the mission/capability requirements for ECS at their DAAC, the MSFC DAAC at full ECS capability will include all of the ECS science data processing and communications subsystems.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions
- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft
- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability
- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III (METEOR), and ACRIM FOO

Several of the driving requirements and milestones are initially supported by Release A but are expanded upon for Release B. For example, infrastructure Data Flow and end-to-end testing and simulation readiness testing are supported early-on by Release A, and will be fully supported by Release B during the final phases of testing. Likewise, V0 interoperability (one way) is

supported by Release A for GSFC, LaRC, and EDC DAACs and is expanded to the remaining DAACs in Release B.

ECS will provide support to nine DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These DAACs are located at: Goddard Space Flight Center (GSFC) in Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; Marshall Space Flight Center (MSFC) Huntsville, AL; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, Jet Propulsion Laboratory (JPL) Pasadena CA; the Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks and the Consortium for International Earth Science Information Network (CIESIN).

This document is part of a series of documents comprising the Science and Communications Development Office design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Control (SMC) center.

This document specifically focuses on the MSFC DAAC ECS configuration and capabilities at Release B. It is released and reviewed at the formal Release B Incremental Design Review (IDR).

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B EDC DAAC Design Specification for the ECS Project [Document Number 305-CD-033]**

This Release B EDC DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of the EDC DAAC in meeting its objectives. The Release B Overview of the SDPS and CSMS (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the reader to get a basic understanding of ECS design components. The Release Plan Content Description Document (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. While some DAAC configurations vary depending on the mission/capability requirements for ECS at their DAAC, the EDC DAAC at full ECS capability will include all of the ECS science data processing and communications subsystems.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions
- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft
- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability
- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III (METEOR), and ACRIM FOO

Several of the driving requirements and milestones are initially supported by Release A but are expanded upon for Release B. For example, infrastructure Data Flow and end-to-end testing and simulation readiness testing are supported early-on by Release A (at varying degrees on a DAAC by DAAC basis), and are fully supported by Release B during the final phases of testing. Similarly, V0 interoperability (one way) is supported by Release A for GSFC, LaRC, and EDC DAACs and is expanded to two-way interoperability for all DAACs at Release B.

ECS will provide support to eight DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These DAACs are located at: Goddard Space Flight Center (GSFC) in Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, Jet Propulsion Laboratory (JPL) Pasadena CA; the Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks and the Consortium for International Earth Science Information Network (CIESIN).

This document is part of a series of documents comprising the Science and Communications Development Office (SCDO) design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Control (SMC) center.

This document specifically focuses on the MSFC DAAC ECS configuration and capabilities at Release B. It is released in and reviewed at the formal Release B Critical Design Review.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B ASF DAAC Design Specification for the ECS Project [Document Number 305-CD-034]**

This Release B ASF DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of the ASF DAAC in meeting its objectives. The Release B Overview of the SDPS and CSMS (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the reader to get a basic understanding of ECS design components. The Release Plan Content Description Document (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. While some DAAC configurations vary depending on the mission/capability requirements for ECS at their DAAC, the ASF DAAC at full ECS capability will include all of the ECS science data processing and communications subsystems except for the processing and planning subsystems.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions
- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft
- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability

- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III (METEOR), and ACRIM FOO

Several of the driving requirements and milestones are initially supported by Release A but are expanded upon for Release B. For example, infrastructure Data Flow and end-to-end testing and simulation readiness testing are supported early-on by Release A (at varying degrees on a DAAC by DAAC basis), and are fully supported by Release B during the final phases of testing. Likewise, V0 interoperability is supported by Release A for GSFC, LaRC, and EDC DAACs and is expanded to the remaining DAACs in Release B. This concept is carried forward to deliveries subsequent to Release B as well.

ECS will provide support to eight DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These DAACs are located at: Goddard Space Flight Center (GSFC) in Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, Jet Propulsion Laboratory (JPL) Pasadena CA; the Consortium for International Earth Science Information Network (CIESIN) in University Center, MI; and the Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks.

This document is part of a series of documents comprising the Science and Communications Development Office (SCDO) design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Coordination (SMC) center.

This document specifically focuses on the ASF DAAC ECS configuration and capabilities at Release B. It is released and reviewed at the formal Release B Critical Design Review.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B NSIDC DAAC Design Specification for the ECS Project [Document Number 305-CD-035]**

This Release B NSIDC DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of the NSIDC DAAC in meeting its objectives. The Release B Overview of the SDPS and CSMS (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the

reader to get a basic understanding of ECS design components. The Release Plan Content Description Document (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. While some DAAC configurations vary depending on the mission/capability requirements for ECS at that DAAC, the NSIDC DAAC at full ECS capability will include all ECS subsystems.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions
- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft
- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability
- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III (METEOR), and ACRIM FOO

Several of the driving requirements and milestones are initially supported by Release A but are expanded upon for Release B. For example, infrastructure Data Flow and end-to-end testing and simulation readiness testing are supported early-on by Release A (at varying degrees on a DAAC by DAAC basis), and are fully supported by Release B during the final phases of testing. Likewise, V0 interoperability is supported by Release A for GSFC, LaRC, and EDC DAACs and is expanded to two-way interoperability for all DAACs at Release B.

ECS will provide support to eight DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These DAACs are located at: Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks; Goddard Space Flight Center (GSFC) in Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, Jet Propulsion Laboratory (JPL) Pasadena CA; and the Consortium for International Earth Science Information Network (CIESIN) in University Center, MI.

This document is part of a series of documents comprising the Science and Communications Development Office (SCDO) design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Coordination (SMC) center.

This document specifically focuses on the NSIDC DAAC ECS configuration and capabilities at Release B. It is released and reviewed at the formal Release B Critical Design Review.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B JPL PO.DAAC Design Specification for the ECS Project [Document Number 305-CD-036]**

This Release B JPL PO.DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of the JPL PO.DAAC in meeting its objectives. The Release B Overview of the SDPS and CSMS (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the reader to get a basic understanding of ECS design components. The Release Plan Content Description Document (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. While some DAAC configurations vary depending on the mission/capability requirements for ECS at their DAAC, the PO.DAAC at full ECS capability will include all of the ECS subsystems.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions
- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft

- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability
- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III (METEOR), and ACRIM FOO

Several of the driving requirements and milestones are initially supported by Release A but are expanded upon for Release B. For example, infrastructure Data Flow and end-to-end testing and simulation readiness testing are supported early-on by Release A (at varying degrees on a DAAC by DAAC basis), and are fully supported by Release B during the final phases of testing. Likewise, V0 interoperability is supported by Release A for GSFC, LaRC, and EDC DAACs and is expanded to two-way interoperability for all DAACs at Release B.

ECS will provide support to eight DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These DAACs are located at: Goddard Space Flight Center (GSFC) in Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, Jet Propulsion Laboratory (JPL) Pasadena CA; the Consortium for International Earth Science Information Network (CIESIN) in University Center, MI and the Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks.

This document is part of a series of documents comprising the Science and Communications Development Office (SCDO) design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Coordination (SMC) center.

This document specifically focuses on the JPL Physical Oceanography DAAC (PO.DAAC) ECS configuration and capabilities at Release B. It is released and reviewed at the formal Release B Critical Design Review.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B ORNL DAAC Design Specification for the ECS Project [Document Number 305-CD-037]**

This Release B ORNL DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID)

305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of the ORNL DAAC in meeting its objectives. The Release B Overview of the SDPS and CSMS (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the reader to get a basic understanding of ECS design components. The Release Plan Content Description Document (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. While some DAAC configurations vary depending on the mission/capability requirements for ECS at their DAAC, the ORNL DAAC at full ECS capability will include all of the ECS communications and science data processing subsystems except the archive and distribution and the planning and data processing subsystems.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions
- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft
- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability
- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III FOO, ACRIM FOO, Space Station and EOS PM-1

Several of the driving requirements and milestones are initially supported by Release A but are expanded upon for Release B. For example, infrastructure Data Flow and end-to-end testing and simulation readiness testing are supported early-on by Release A (at varying degrees on a DAAC by DAAC basis), and are fully supported by Release B during the final phases of testing. Likewise, V0 interoperability is supported by Release A for GSFC, LaRC, and EDC DAACs and is expanded to two-way interoperability for all DAACs at Release B.

ECS will provide support to eight DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These

DAACs are located at: Goddard Space Flight Center (GSFC) in Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, Jet Propulsion Laboratory (JPL) Pasadena CA; the Consortium for International Earth Science Information Network (CIESIN) in University Center, MI and the Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks.

This document is part of a series of documents comprising the Science and Communications Development Office (SCDO) design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Coordination (SMC) center.

This document specifically focuses on the ORNL DAAC ECS configuration and capabilities at Release B. It is released and reviewed at the formal Release B Critical Design Review.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B System Monitoring and Coordination Center Design Specification for the ECS Project [Document Number 305-CD-038]**

This Release B SMC DAAC Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of this document is to show the elements of the Release B ECS science data processing and communications design and implementation that will support the ECS portion of the SMC in meeting its objectives. The Release B Overview of the SDPS and CSMS (305-CD-020-002) provides an overview of the ECS subsystems and should be used by the reader to get a basic understanding of ECS design components. The Release Plan Content Description Document (222-TP-003-008) provides a detailed mapping of functional capabilities and services that will be available for each release. The majority of the capabilities at the SMC are satisfied by the design and implementation of the Communications and System Management Segment subsystems, however, some science data processing subsystem functionality will be provided to support resource planning and coordination.

Release B of ECS supports functional capabilities and services required to meet driving requirements and milestones including:

- Functionality/services required to support mission operations for the continuation of TRMM, as well as the initiation of LANDSAT 7, COLOR, ADEOS II and EOS AM-1. This includes planning and scheduling, command and control, production data processing, data distribution and other ECS functions

- Functionality/services required to support mission operations for the initiation of SAGE III (METEOR) and ACRIM Flight-Of-Opportunity (FOO). This includes production data processing, data distribution and other ECS functions
- Provide information management, data distribution and a high level archive for the SAR data from the ERS-1/2, JERS-1 and RADARSAT spacecraft
- Functionality/services required to support EOS ground system interface testing, which includes end-to-end mission simulations, communication services for EBnet, network management services and other ECS services
- Functionality/services required for V0 Interoperability
- Functionality/services required for Science Software I&T Support for TRMM, LANDSAT 7, COLOR, ADEOS II, EOS AM-1, SAGE III (METEOR) and ACRIM FOO

ECS will provide support to eight DAACs. The DAACs are tasked with generating EOS standard data products and carrying out NASA's responsibilities for data archive, distribution and information management. The DAACs serve as the primary user interface to EOSDIS. These DAACs are located at: Goddard Space Flight Center (GSFC) in Greenbelt, MD; Langley Research Center (LaRC) Hampton, VA; Oak Ridge National Laboratory (ORNL) Oak Ridge, TN; EROS Data Center (EDC) Sioux Falls, SD; National Snow and Ice Data Center (NSIDC) Boulder, Jet Propulsion Laboratory (JPL) Pasadena CA; the Consortium for International Earth Science Information Network (CIESIN) in University Center, MI and the Alaska SAR Facility (ASF) at the University of Alaska, Fairbanks.

This document is part of a series of documents comprising the Science and Communications Development Office (SCDO) design specification for the Communications and System Management Segment (CSMS) and the Science and Data Processing Subsystem (SDPS) for Release B. The series of documents include an overview, a design specification document for each subsystem and a design implementation document for each DAAC involved in the release, as well as one for the System Monitoring and Control (SMC) center.

This document specifically focuses on the SMC configuration and capabilities at Release B. It is released in support of the Release B Critical Design Review.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B Data Dictionary Subsystem Design Specification for the ECS Project [Document Number 305-CD-039]**

This Release B Data Dictionary for Subsystem Design Specification for the ECS Project, Contract Data Requirement List (CDRL) item 039, with requirements specified in Data Item Description (DID) 305/DV10, is a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS), Contract NAS5-60000. This publication is a

part of a series of documents comprising the Science and Communications Development Office Science and Data Processing Segment (SDPS) for Release B.

The Release B Data Dictionary for Subsystem Design Specification defines the progress of the design. It defines the object classes and attributes for all subsystems referenced in Section 2.2.

This document specifically focuses on the System Management Center configuration and capabilities at Release B. It is released in support of the Release B Critical Design Review.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release 4 Segment/Design Specification for the ECS Project [Document Number 305-CD-100]**

This document provides the Segment/Design Specification for the ECS project, which is defined by Data Item Description (DID) 305/DV2 (F).

The purpose of the Segment/Design Specification for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) is to provide an overview of the hardware and software subsystems of the project. This document describes the detailed design of each ECS software subsystem implemented to satisfy the allocated and derived functional and performance requirements. This document also provides basic descriptions of the Commercial Off The Shelf (COTS) hardware and software used in the ECS. This document contains:

- Functional overviews of each Computer Software Configuration Item (CSCI)
- Context diagrams of each CSCI
- Interface event descriptions based on the context diagrams
- Process architecture diagrams
- Interface description tables based on the process architecture diagrams
- CSCI data stores (databases as they relate to the process architecture)
- CSCI functions allocated to processes. For data servers, this includes descriptions of the functionality offered to clients via the server interfaces. For Graphical User Interface (GUI) applications, it describes the functionality provided to the GUI users.
- Specific limitations of the capabilities provided
- Summary of object classes listed by CSCI
- Summary of class libraries listed by CSCI
- Abbreviations and Acronyms

Hyper-linked on-line documentation generated by ABC++ is provided to accompany this document. The various subsystems, sub-directories, processes, libraries, and classes can be

browsed down to the code level. This documentation can be accessed through the Universal Resource Locator (URL) http://ecsdocs.east.hitc.com:88 for those who have access to the ECS internally at the Landover Facility. For anyone not having access to the ECS internally at the Landover facility, the Data Management Office of the ECS Project must be contacted for access.

Under every process or library documented in Appendix A or B, there is a directory string. This string indicates the location of the Makefile and sources for the library.

This same directory string can be used to locate on-line documentation. This is accomplished by replacing the "/ecs/formal" part of the directory string with the URL for the on-line documentation associated with the page on which the classes are listed along with the names of processes and libraries which share those classes.

- **Release 5A Segment/Design Specification for the ECS Project [Document Number 305-CD-500]**

This document provides the Segment/Design Specification for the ECS project, which is defined by Data Item Description (DID) 305/DV2 (F).

The purpose of the Segment/Design Specification for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) is to provide an overview of the hardware and software subsystems of the project. This document describes the detailed design of each ECS software subsystem implemented to satisfy the allocated and derived functional and performance requirements. This document also provides basic descriptions of the Commercial Off The Shelf (COTS) hardware and software used in the ECS. This document contains:

- Functional overviews of each Computer Software Configuration Item (CSCI)
- Context diagrams of each CSCI
- Interface event descriptions based on the context diagrams
- Process architecture diagrams
- Interface event description tables based on the process architecture diagrams
- CSCI data stores (databases as they relate to the process architecture diagrams)
- CSCI functions allocated to processes. For data servers, this includes descriptions of the functionality offered to clients via the server interfaces. For Graphical User Interface (GUI) applications, it describes the functionality provided to the GUI users.
- Specific limitations of the capabilities provided
- Summary of object classes listed by CSCI
- Summary of class libraries listed by CSCI
- Abbreviations and Acronyms

Hyper-linked on-line documentation generated by ABC++ is provided to accompany this document. The various subsystems, sub-directories, processes, libraries, and classes can be

browsed down to the code level. This documentation can be accessed through the Universal Resource Locator (URL) http://ecsdocs.east.hitc.com:88 for those who have access to the ECS internally at the Landover Facility. For anyone not having access to the ECS internally at the Landover facility, the Data Management Office of the ECS Project must be contacted for access.

Under every process or library documented in Appendix A or B, there is a directory string. This string indicates the location of the Makefile and sources for the library.

This same directory string can be used to locate on-line documentation. This is accomplished by replacing the "/ecs/formal" part of the directory string with the URL for the on-line documentation associated with the page on which the classes are listed along with the names of processes and libraries which share those classes.

- **Release 5B Segment/Design Specification for the ECS Project [Document Number 305-CD-510]**

This document provides the Segment/Design Specification for the ECS project, which is defined by Data Item Description (DID) 305/DV2 (F).

The purpose of the Segment/Design Specification for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) is to provide an overview of the hardware and software subsystems of the project. This document describes the detailed design of each ECS software subsystem implemented to satisfy the allocated and derived functional and performance requirements. This document also provides basic descriptions of the Commercial Off The Shelf (COTS) hardware and software used in the ECS. This document contains:

- Functional overviews of each Computer Software Configuration Item (CSCI)
- Context diagrams of each CSCI
- Interface event descriptions based on the context diagrams
- Process architecture diagrams
- Interface event description tables based on the process architecture diagrams
- CSCI data stores (databases as they relate to the process architecture diagrams)
- CSCI functions allocated to processes. For data servers, this includes descriptions of the functionality offered to clients via the server interfaces. For Graphical User Interface (GUI) applications, it describes the functionality provided to the GUI users.
- Specific limitations of the capabilities provided
- Summary of object classes listed by CSCI
- Summary of class libraries listed by CSCI
- Abbreviations and Acronyms

Hyper-linked on-line documentation generated by ABC++ is provided to accompany this document. The various subsystems, sub-directories, processes, libraries, and classes can be

browsed down to the code level. This documentation can be accessed through the Universal Resource Locator (URL) http://ecsdocs.east.hitc.com:88 for those who have access to the ECS internally at the Landover Facility. For anyone not having access to the ECS internally at the Landover facility, the Data Management Office of the ECS Project must be contacted for access.

Under every process or library documented in Appendix A or B, there is a directory string. This string indicates the location of the Makefile and sources for the library.

This same directory string can be used to locate on-line documentation. This is accomplished by replacing the "/ecs/formal" part of the directory string with the URL for the on-line documentation associated with the page on which the classes are listed along with the names of processes and libraries which share those classes.

- **Release 6A Segment/Design Specification for the ECS Project [Document Number 305-CD-600]**

This document provides the Segment/Design Specification for the ECS project, which is defined by Data Item Description (DID) 305/DV2 (F).

The purpose of the Segment/Design Specification for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) is to provide an overview of the hardware and software subsystems of the project. This document describes the detailed design of each ECS software subsystem implemented to satisfy the allocated and derived functional and performance requirements. This document also provides basic descriptions of the Commercial Off The Shelf (COTS) hardware and software used in the ECS. This document contains:

- Functional overviews of each Computer Software Configuration Item (CSCI)
- Context diagrams of each CSCI
- Interface event descriptions based on the context diagrams
- Process architecture diagrams
- Interface event description tables based on the process architecture diagrams
- CSCI data stores (databases as they relate to the process architecture diagrams)
- CSCI functions allocated to processes. For data servers, this includes descriptions of the functionality offered to clients via the server interfaces. For Graphical User Interface (GUI) applications, it describes the functionality provided to the GUI users.
- Specific limitations of the capabilities provided
- Summary of object classes listed by CSCI
- Summary of class libraries listed by CSCI
- Abbreviations and Acronyms

Hyper-linked on-line documentation generated by ABC++ is provided to accompany this document. The various subsystems, sub-directories, processes, libraries, and classes can be

browsed down to the code level. This documentation can be accessed through the Universal Resource Locator (URL) http://scooby.hitc.com:8080/ecs/index.html for those who have access to the ECS internally at the Landover Facility. For anyone not having access to the ECS internally at the Landover facility, the Data Management Office of the ECS Project must be contacted for access.

Under every process or library documented in Appendix A or B, there is a directory string. This string indicates the location of the Makefile and sources for the library.

This same directory string can be used to locate on-line documentation. This is accomplished by replacing the "/ecs/formal" part of the directory string with the URL for the on-line documentation associated with the page on which the classes are listed along with the names of processes and libraries which share those classes.

- **(End of Contract) Segment/Design Specification for the ECS Project [Document Number 305-CD-6B]**

This document provides the Segment/Design Specification for the ECS project instead of the Release 6B version, which is defined by Data Item Description (DID) 305/DV2 (F).

The purpose of the Segment/Design Specification for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) is to provide an overview of the hardware and software subsystems of the project. This document describes the detailed design of each ECS software subsystem implemented to satisfy the allocated and derived functional and performance requirements. This document also provides basic descriptions of the Commercial Off The Shelf (COTS) hardware and software used in the ECS. This document contains:

- Functional overviews of each Computer Software Configuration Item (CSCI)
- Context diagrams of each CSCI
- Interface event descriptions based on the context diagrams
- Process architecture diagrams
- Interface event description tables based on the process architecture diagrams
- CSCI data stores (databases as they relate to the process architecture diagrams)
- CSCI functions allocated to processes. For data servers, this includes descriptions of the functionality offered to clients via the server interfaces. For Graphical User Interface (GUI) applications, it describes the functionality provided to the GUI users.
- Specific limitations of the capabilities provided
- Summary of object classes listed by CSCI
- Summary of class libraries listed by CSCI
- Abbreviations and Acronyms

Hyper-linked on-line documentation generated by ABC++ is provided to accompany this document. The various subsystems, sub-directories, processes, libraries, and classes can be browsed down to the code level. This documentation can be accessed through the Universal Resource Locator (URL) http://guiness.hitc.com:8080/ecs/index.html for those who have access to the ECS internally at the Landover Facility. For anyone not having access to the ECS internally at the Landover facility, the Data Management Office of the ECS Project must be contacted for access.

Under every process or library documented in Appendix A or B, there is a directory string. This string indicates the location of the Makefile and sources for the library.

This same directory string can be used to locate on-line documentation. This is accomplished by replacing the "/ecs/formal" part of the directory string with the URL for the on-line documentation associated with the page on which the classes are listed along with the names of processes and libraries which share those classes.

- **Release 4 ECS Internal Interface Control Document for the ECS Project [Document Number 313-CD-100 or 313-CD-006-007]**

This Release 4 (Drop 4PX) ECS Internal Interface Control Document (ICD) for the ECS Project, Contract Data Requirement List (CDRL) item 051, with requirements specified in Data Item Description (DID) 313/DV3, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The Drop 4PX Internal ICD specifies software interfaces internal to the CSMS/SDPS software architecture. It defines Drop 4PX services in the context of system level scenarios. The relationships and interactions between the Drop 4PX CSCIs are presented. This document also describes how ECS infrastructure services are used by the ECS internal applications.

This document addresses all interface classes from SDPS and CSMS CSCIs, which are linked to create a desired scenario. External interfaces are mapped to the internal ECS object(s) that provide the service.

This document describes the ECS system in terms of its support of several primary scenarios. These scenarios, based on the normal support of EOS instruments, are listed below and are described in Section 3.

- Install ESDTs (Earth Science Data Types)
- System Startup/Shutdown (ECS Custom Software)
- MODIS (an instrument on the AM-1 spacecraft which provides data to three DAACs)
- Landsat-7
- ASTER (an instrument on the AM-1 spacecraft which provides data to Japan (GDS))
- Planning Scenarios
- EDOS/FDS Ephemeris/Attitude Data Processing
- Fault Recovery

- **Release 5A ECS Internal Interface Control Document for the ECS Project [Document Number 313-CD-500]**

This Release 5A ECS Internal Interface Control Document (ICD) for the ECS Project, Contract Data Requirement List (CDRL) item 051, with requirements specified in Data Item Description (DID) 313/DV3, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000), Revision B, December 1998 (4234103).

The Release 5A Internal ICD specifies software interfaces internal to the CSMS/SDPS software architecture. It defines Release 5A services in the context of system level scenarios. The relationships and interactions between the Release 5A CSCIs are presented. This document also describes how ECS infrastructure services are used by the ECS internal applications.

This document addresses all interface classes from SDPS and CSMS CSCIs, which are linked to create a desired scenario. External interfaces are mapped to the internal ECS object(s) that provide the service.

This document is not intended to include hardware interface information between subsystems or hardware descriptions. Subsystem hardware is described in CDRL 305. Any reference to hardware processes in this document is meant to portray functional activity relative to software processes and not specific hardware functions.

This document describes the ECS system in terms of its support of several primary scenarios. These scenarios, based on the normal support of EOS instruments, are listed below and are described in Section 3.

- Install ESDTs (Earth Science Data Types)
- System Startup/Shutdown (ECS Custom Software)
- MODIS (an instrument on the AM-1 spacecraft which provides data to three DAACs)
- Landsat-7
- ASTER (an instrument on the AM-1 spacecraft which provides data to Japan (GDS))
- Planning Scenarios
- EDOS/FDS/ EMOS Interfaces
- Cross Mode/DAAC Scenario
- Science Investigator-Led Processing Systems (SIPS) Scenario
- Fault Recovery

- **Release 5B ECS Internal Interface Control Document for the ECS Project [Document Number 313-CD-510]**

This Release 5B ECS Internal Interface Control Document (ICD) for the ECS Project, Contract Data Requirement List (CDRL) item 051, with requirements specified in Data Item Description (DID) 313/DV3, is a required deliverable in its final form under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000), (423-41-03).

The Release 5B Internal ICD specifies software interfaces internal to the CSMS/SDPS software architecture. It defines Release 5B services in the context of system level scenarios. The relationships and interactions between the Release 5B CSCIs are presented. This document also describes how ECS infrastructure services are used by the ECS internal applications.

This document addresses all interface classes from SDPS and CSMS CSCIs, which are linked to create a desired scenario. External interfaces are mapped to the internal ECS object(s) that provide the service.

This document is not intended to include hardware interface information between subsystems or hardware descriptions. Subsystem hardware is described in CDRL 305. Any reference to hardware processes in this document is meant to portray functional activity relative to software processes and not specific hardware functions.

This document describes the ECS system in terms of its support of several primary scenarios. These scenarios, based on the normal support of EOS instruments, are listed below and are described in Section 3.

- ESDTs (Earth Science Data Types)
- System Startup/Shutdown (ECS Custom Software)
- MODIS (an instrument on the Terra spacecraft which provides data to three DAACs)
- Landsat-7
- ASTER (an instrument on the Terra spacecraft which provides data to Japan (GDS))
- Planning Scenarios
- EDOS/FDD/ EMOS Interfaces
- Cross Mode/DAAC Scenario
- Science Investigator-Led Processing Systems (SIPS) Scenario
- Fault Recovery

- **Release 6A ECS Internal Interface Control Document for the ECS Project [Document Number 313-CD-600]**

This Release 6A ECS Internal Interface Control Document (ICD) for the ECS Project, Contract Data Requirement List (CDRL) item 051, with requirements specified in Data Item Description (DID) 313/DV3, is a required deliverable in its final form under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000), Revision C, October 1999 (423-41-03).

The Release 6A Internal ICD specifies software interfaces internal to the CSMS/SDPS software architecture. It defines Release 6A services in the context of system level scenarios. The relationships and interactions between the Release 6A CSCIs are presented. This document also describes how ECS infrastructure services are used by the ECS internal applications.

This document addresses all interface classes from SDPS and CSMS CSCIs, which are linked to create a desired scenario. External interfaces are mapped to the internal ECS object(s) that provide the service.

This document is not intended to include hardware interface information between subsystems or hardware descriptions. Subsystem hardware is described in CDRL 305. Any reference to hardware processes in this document is meant to portray functional activity relative to software processes and not specific hardware functions.

This document describes the ECS system in terms of its support of several primary scenarios. These scenarios, based on the normal support of EOS instruments, are listed below and are described in Section 3.

- ESDTs (Earth Science Data Types)
- System Startup/Shutdown
- MODIS (an instrument on the Terra spacecraft which provides data to three DAACs)
- Landsat-7
- ASTER (an instrument on the Terra spacecraft which provides data to Japan (GDS))
- Planning Scenarios
- EDOS/FDD/ EMOS Interfaces
- Cross Mode/DAAC Scenario
- Science Investigator-Led Processing Systems (SIPS) Scenario
- Fault Recovery

- **Release 6B ECS Internal Interface Control Document for the ECS Project [Document Number 313-CD-6B]**

This Release 6B ECS Internal Interface Control Document (ICD) for the ECS Project, Contract Data Requirement List (CDRL) item 051, with requirements specified in Data Item Description (DID) 313/DV3, is a required deliverable in its final form under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000), Revision C, October, 1999 (423-41-03).

The Release 6B Internal ICD specifies software interfaces internal to the CSMS/SDPS software architecture. It defines Release 6A.xx services in the context of system level scenarios. The relationships and interactions between the Release 6A.xx CSCIs are presented. This document also describes how ECS infrastructure services are used by the ECS internal applications.

This document addresses all interface classes from SDPS and CSMS CSCIs, which are linked to create a desired scenario. External interfaces are mapped to the internal ECS object(s) that provide the service.

This document is not intended to include hardware interface information between subsystems or hardware descriptions. Subsystem hardware is described in the 305 document identified in sub-section 2.2. Any reference to hardware processes in this document is meant to portray functional activity relative to software processes and not specific hardware functions.

This document describes the ECS system in terms of its support of several primary scenarios. These scenarios, based on the normal support of EOS instruments, are listed below and are described in Section 3.

- ESDTs (Earth Science Data Types)
- System Startup/Shutdown
- MODIS (an instrument on the Terra spacecraft which provides data to three DAACs)
- Landsat-7
- ASTER (an instrument on the Terra spacecraft which provides data to Japan (GDS))
- Planning Scenarios
- EDOS/FDD/EMOS Interfaces
- Cross Mode/DAAC Scenario
- Science Investigator-Led Processing Systems (SIPS) Scenario
- Fault Recovery

### 3.1.3 System Security

- **Failure Modes and Effects Analyses (FMEA) and Critical Items List (CIL) for the ECS Project [Document Number 517-CD-001]**

This document is submitted as required by CDRL item 090, DID 517/PA2, whose requirements are specified in this document as a deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract NAS5-60000.

The purpose of the FMEA is to identify potential castastrophic and critical failures of the FOS critical real-time functions so that susceptibility to the failures and their effects can be reduced or eliminated from the ECS system. The analysis was directed to reveal any single point failures in the FOS components that provide critical real-time functions so that such failures can be completely eliminated. In the event that potential critical failures cannot be eliminated, mitigation plans will be identified to ensure that the effect of a failure on the overall ECS system is minimal. Since the individual failure modes are listed and evaluated in orderly fashion, the FMEA also serves to verify the FOS Real Time design integrity, identify undesirable failure modes and document reliability risks. FMEA results not only provide design guidance, but can be used advantageously during maintenance planning analysis, logistics support analysis, hazard analysis and fault recovery management design.

This document incorporates the Government's comments to the Failure Modes and Effects Analysis/Critical Items List (FMEA/CIL) deliverable, which was submitted at the (FOS) Critical Design Review (CDR) time frame. This submittal addresses all GSFC Code 300 findings stated in the Data Item Description (DID) approval letter received by HAIS on November 8, 1995.

This version of the analysis is a final submittal as required by CDRL item 090, DID 517/PA2, which provides updated information to reflect the FOS Release A/B hardware configuration at the CDR time frame. The analysis approach to be used for this FMEA is a hardware approach by which each potential hardware failure mode of the Critical Command and Control (or Critical Real-Time) systems of the FOS and the related network equipment that supports the Real-Time functions, is analyzed to determine the effects thereof on the overall ECS system and to classify each potential failure mode according to its severity.

The analysis does not quantify the probability for failure occurrence; but rather a qualitative assessment of the failure effect is gained by assigning the failure mode to a severity category.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Risk Management Plan for the LaRC DAAC [Document Number 215-CD-005]**

The risk assessment process is a structured process that helps the line manager determine security vulnerabilities detected on project systems. This process further enables the manager to identify various threats that could put his/her system at risk, assess the impact of identified risks and determine which risks are acceptable.

The purpose of this risk management plan is to summarize the risk assessment methodology, identify the ECS security risks, and describe the general security risk management strategies for the LaRC DAAC.

The plan concentrates on the security controls associated with the identified security risks of ECS data and information. While it gives general guidance on physical and administrative security controls, it does not address specific physical and administrative protective controls.

The plan identifies security controls that:

- maintain a high degree of integrity, availability, and confidentiality of ECS systems and data;
- minimize the potential for abuse or misuse of ECS information technology (IT) assets;
- minimize harm or loss from accidental, malicious, or natural events to ECS systems and data; and
- maintain continuity of ECS operations

This Risk Management Document identifies all known vulnerabilities residing on Information Technology (IT) assets at **the LaRC ECS DAAC**. Completion of this risk assessment satisfies the Federal security requirement identified in the Office of Management and Budget (OMB) Circular Number A-130, Appendix III. This phase of the EOSDIS Risk Management Program is to satisfy immediate project compliance with the NPG 2810.1 security policy.

- **Risk Management Plan for the GSFC DAAC [Document Number 215-CD-006]**

The Risk Management Plan for ECS GSFC DAAC is a required (constituent) deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000. This plan provides the IT security risk management planning for the ECS GSFC Distributed Active Archive Center (GDAAC) located at the Goddard Space Flight Center (GSFC), Greenbelt MD 20771, Building 32. This plan has been developed in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1 and OMB Circular A-130, Appendix III.

The purpose of the ECS GDAAC risk management plan is to summarize the risk assessment methodology, identify the ECS GDAAC security risks, and describe the general security risk management strategies for the GDAAC.

This Risk Management Plan identifies known vulnerabilities residing on Information Technology (IT) assets at the GDAAC. This plan is applicable to the ECS GDAAC IT systems, and IT networks located in GSFC building32. These systems are located in room 101, (the maintenance and engineering office area), room 101C (the operations area), and room W30 (the data archive area).

- **NSIDC DAAC ECS Information Technology (IT) Risk Management Plan [Document Number 215-CD-007]**

The risk assessment process is a structured process that helps the line manager determine security vulnerabilities detected on project systems. This process further enables the manager to identify various threats that could put his/her system at risk, assess the impact of identified risks and determine which risks are acceptable.

This Risk Management Document identifies all known vulnerabilities residing on Information Technology (IT) assets of the NSIDC DAAC. Completion of this risk assessment satisfies the Federal security requirement identified in the Office of Management and Budget (OMB) Circular Number A-130, Appendix III. This phase of the EOSDIS Risk Management Program is to satisfy immediate project compliance with the NPG 2810.1 security policy.

- **ECS Risk Management Plan for the EDC DAAC [Document Number 215-CD-008]**

The risk assessment process is a structured process that helps the line manager determine security vulnerabilities detected on project systems. This process further enables the manager to identify various threats that could put his/her system at risk, assess the impact of identified risks and determine which risks are acceptable.

The purpose of this risk management plan is to summarize the risk assessment methodology, identify the ECS security risks, and describe the general security risk management strategies for the EDC DAAC.

The plan concentrates on the security controls associated with the identified security risks of ECS data and information. While it gives general guidance on physical and administrative security controls, it does not address specific physical and administrative protective controls.

The plan identifies security controls that:

- maintain a high degree of integrity, availability, and confidentiality of ECS systems and data;
- minimize the potential for abuse or misuse of ECS information technology (IT) assets;
- minimize harm or loss from accidental, malicious, or natural events to ECS systems and data; and
- maintain continuity of ECS operations

This Risk Management Document identifies all known vulnerabilities residing on Information Technology (IT) assets at the EDC ECS DAAC. Completion of this risk assessment satisfies the Federal security requirement identified in the Office of Management and Budget (OMB) Circular Number A-130, Appendix III. This phase of the EOSDIS Risk Management Program is to satisfy immediate project compliance with the NPG 2810.1 security policy.

- **Risk Management Plan for the SMC [Document Number 215-CD-009]**

The ECS System Monitoring and Coordination Center (SMC) Information Technology (IT) Risk Management Plan is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000. This plan provides the IT security risk management planning for the ECS GSFC System Monitoring and Coordination Center (SMC) located at the Goddard Space Flight Center (GSFC), Greenbelt MD 20771, Building 32. This plan has been developed in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1 and OMB Circular A-130, Appendix III.

The purpose of the ECS SMC risk management plan is to summarize the risk assessment methodology, identify the ECS SMC security risks, and describe the general security risk management strategies for the SMC.

This Risk Management Plan identifies known vulnerabilities residing on Information Technology (IT) assets at the SMC. This plan is applicable to the ECS SMC IT systems, and IT networks located in GSFC building32. These systems are located in room 101, (the maintenance and engineering office area), room 101C (the operations area), and room W30 (the data archive area).

- **Risk Management Plan for the PVC/VATC [Document Number 215-CD-010]**

The risk assessment process is a structured process that helps the line manager determine security vulnerabilities detected on project systems. This process further enables the manager to identify various threats that could put his/her system at risk, assess the impact of identified risks and determine which risks are acceptable.

The purpose of this risk management plan is to summarize the risk assessment methodology, identify the ECS security risks, and describe the general security risk management strategies for the EDF.

The plan concentrates on the security controls associated with the identified security risks of ECS data and information. While it gives general guidance on physical and administrative security controls, it does not address specific physical and administrative protective controls.

The plan identifies security controls that:

- maintain a high degree of integrity, availability, and confidentiality of ECS systems and data;
- minimize the potential for abuse or misuse of ECS information technology (IT) assets;
- minimize harm or loss from accidental, malicious, or natural events to ECS systems and data; and
- maintain continuity of ECS operations

This Risk Management Document identifies all known vulnerabilities residing on Information Technology (IT) assets at **the ECS Development Facility (EDF).** Completion of this risk assessment satisfies the Federal security requirement identified in the Office of Management and Budget (OMB) Circular Number A-130, Appendix III. This phase of the EOSDIS Risk

Management Program is to satisfy immediate project compliance with the NPG 2810.1 security policy.

- **LaRC DAAC Information Technology Security Contingency Plan for the ECS Project [Document Number 220-CD-100]**

This document is the Information Technology (IT) Security Contingency Plan for the **Langley Distributed Active Archive Center** located at **2 Wright Street, NASA/Langley Research Center, Hampton, Virginia.** It has been developed in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1) and OMB Circular A-130, Appendix III, and covers all critical business functions performed by the Langley DAAC for the EOSDIS project as identified in **NAS5-60000.**

This plan establishes the procedures and identifies personnel necessary to respond to an unexpected and undesirable emergency or disaster that could prevent the **Langley DAAC** ITS and networks from providing the expected level of service. This plan is applicable to the following **ASCD** Facilities:

| Facility | Building & Room |
|---|---|
| **Langley DAAC** | **Building 1268C - Room 2303** |

- **ECS GSFC DAAC Information Technology Security Contingency Plan [Document Number 220-CD-101]**

The ECS GDAAC Information Technology (IT) Security Contingency Plan is a required (constituent) deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000. This plan provides the IT security contingency planning for the ECS GSFC Distributed Active Archive Center (GDAAC) located at the Goddard Space Flight Center (GSFC), Greenbelt MD 20771, Building 32. This plan has been developed in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1 and OMB Circular A-130, Appendix III.

The purpose of this plan is to provide GDAAC specific contingency planning, establish recovery processes, identify key personnel and define those key personnel duties necessary to respond to various emergency or disaster conditions. These conditions are defined as those scenarios that would prevent the GSFC DAAC IT systems and networks from providing the required level of service.

The ECS GDAAC IT security contingency plan addresses recovery from unplanned and undesirable events that could result in the total or partial loss of system capabilities, hardware, software and data. This plan is applicable to the GSFC DAAC IT systems, and ECS related IT networks located in GSFC Building 32. These systems are located in room 101, (the maintenance and engineering office area), room 101C (the operations area), and room W30 (the data archive area).

- **NSIDC DAAC Information Technology Security Contingency Plan [Document Number 220-CD-102]**

This document is the Information Technology (IT) Security Contingency Plan for the NSIDC DAAC located at the University of Colorado, Boulder**.** It has been developed in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1) and OMB Circular A-130, Appendix III, and covers all critical business functions performed by the NSIDC DAAC for the EOSDIS project as identified in (contract agreement or memorandum of understanding identification).

This plan establishes the procedures and identifies personnel necessary to respond to an unexpected and undesirable emergency or disaster that could prevent the NSIDC DAAC ITS and networks from providing the expected level of service. This plan is applicable to the following NSIDC DAAC Facilities.

| Facility | Building & Room |
|---|---|
| NSIDC EOSDIS Core System Facility | RL-2 376A |

- **ECS Information Technology Security Contingency Plan for the EDC DAAC [Document Number 220-CD-103]**

This document is the Information Technology (IT) Security Contingency Plan for the NASA EOSDIS Core System (ECS) Science Data Processing System (SDPS) located at the Earth Resources Observation Systems (EROS) Data Center (EDC). EDC is a facility managed and maintained by the National Mapping Division (NMD) of the United States Geological Survey (USGS) which is an agency of the Department of the Interior (DoI). The EDAAC is managed by USGS through and inter-agency agreement with NASA. This plan provides the IT security contingency planning for the ECS GSFC Distributed Active Archive Center (GDAAC) located at the Goddard Space Flight Center (GSFC), Greenbelt MD 20771, Building 32. This plan has been developed in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1 and OMB Circular A-130, Appendix III, and covers all critical business functions performed by the EDC ECS SDPS for the EOSDIS Program as identified in contract agreement NAS5-60000.

The EDC ECS SDPS is one element of the EDC Distributed Active Archive Center (EDAAC). The EDAAC is responsible for the IT Security Plan Contingency Plan, which in turn is the parent document for this plan. Because the ECS SDPS was under development by NASA at the writing of this plan, the NASA development contractor provided this plan as a supplement to the EDAAC plan. Major parts of this document will refer to EDC documented policies and procedures since EDC provides the facilities to house the EDC ECS SDPS as GFE.

This plan was not designed to be a living document but rather a document that collects in one place a road map to information documented elsewhere under other site specific configuration control. As such, this plan is used by management staff to inventory the procedures necessary to respond to an unexpected and undesirable emergency or disaster that could prevent the EDC ECS SDPS ITS and networks from providing the expected level of service. The procedures

themselves are living documents, which constantly evolve with changes to the EDC facility, systems and key personnel. This plan is applicable to the following NSIDC DAAC Facilities.

| Facility | Building & Room |
|---|---|
| EROS Data Center | EDC Computer Room 2 |
| 479145 252nd Street | |
| Sioux Falls, SD 57198-001 | |

- **ECS SMC Technology Security Contingency Plan [Document Number 220-CD-104]**

The ECS System Monitoring and Coordination Center (SMC) Information Technology (IT) Security Contingency Plan is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000. This plan provides the IT security contingency planning for the ECS GSFC System Monitoring and Coordination Center (SMC) located at the Goddard Space Flight Center (GSFC), Greenbelt MD 20771, Building 32. This plan has been developed in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1 and OMB Circular A-130, Appendix III.

The purpose of this plan is to provide SMC specific contingency planning, establish recovery processes, identify key personnel and define those key personnel duties necessary to respond to various emergency or disaster conditions. These conditions are defined as those scenarios that would prevent the SMC IT systems and networks from providing the required level of service.

The SMC IT security contingency plan addresses recovery from unplanned and undesirable events that could result in the total or partial loss of system capabilities, hardware, software and data. This plan is applicable to the SMC IT systems located in GSFC Building 32, and SMC related IT networks. These systems are located in room C101, (the maintenance and engineering office area), room C101C (the operations area).

- **EDF VATC and PVC Information Technology Security Contingency Plan for the ECS Project [Document Number 220-CD-105]**

This document is the Information Technology (IT) Security Contingency Plan for the ECS Performance and Verification Center (PVC) and the Verification and Acceptance Test Center (VATC) located at the ECS Development Facility (EDF) in Upper Marlboro, MD**.** The PVC and VATC have developed it in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1) and OMB Circular A-130, Appendix III, and covers all critical business functions performed for the EOSDIS project.

This plan establishes the procedures and identifies personnel necessary to respond to an unexpected and undesirable emergency or disaster that could prevent the ECS Development Facility's ITS and networks from providing the expected level of service. This plan is applicable to the PVC and VATC systems within the ECS Development Facility (also referred to as the "Landover Site").

| Facility | Building & Room |
|---|---|
| ECS Development Facility | PVC - Computer Room 1105, 1050 |
| 1616 McCormick Drive | VATC - Computer Room 1105, 1100, 1028 |
| Upper Marlboro, MD 20774 | |

- **EMOS Information Technology Security Plan [Document Number 214-CD-100]**

The EMOS Operations Center is a satellite operations center in Building 32 at NASA's Goddard Space Flight Center (GSFC). There is a backup EOC located in Building 14 at GSFC. The EOC performs the command and control, telemetry processing, mission planning, and detailed spacecraft bus and payload analysis for multiple Earth Observing System satellites. The first spacecraft, Terra (AM-1) built by Lockheed Martin, was launched in late 1999. It presently is in normal operations status. The next spacecraft, Aqua (PM-1) built by TRW, is due to be launched later this year (2001). The EMOS EOC is currently performing pre-launch activities for that spacecraft. Future spacecraft launch and routine operations are expected to be added to the EMOS EOC. This includes Aura, also built by TRW and possibly ICESAT.

- **EMOS Information Technology Risk Management Plan [Document Number 215-CD-100]**

The risk assessment process is a structured process that helps the line manager determine security vulnerabilities detected on project systems. This process further enables the manager to identify various threats that could put their system at risk, assess the impact of identified risks to the systems, and determine which risks are acceptable.

This Risk Management Plan identifies all known vulnerabilities residing on Information Technology (IT) assets for the EMOS Operations Center (EOC) and Backup EOC. Completion of this risk assessment satisfies the Federal security requirement identified in the Office of Management and Budget (OMB) Circular Number A-130, Appendix III. This phase of the Earth Observing System Data and Information System (EOSDIS) Risk Management Program is to satisfy immediate project compliance with the National Aeronautics and Space Administration (NASA) Procedures and Guidelines (NPG) 2810.1 security policy.

- **EMOS Information Technology Risk Assessment Plan [Document Number 215-CD-101]**

The risk assessment process is a structured process that helps the line manager determine security vulnerabilities detected on project systems. This process further enables the manager to identify various threats that could put the system at risk, assess the impact of identified risks to the systems, and determine which risks are acceptable.

This Risk Assessment Document identifies all known vulnerabilities residing on Information Technology (IT) assets for the EMOS Operations Center (EOC), the Backup EOC, and the associated EMOS Maintenance and Operations (M&O) Local Area Network (LAN). Completion of this risk assessment satisfies the Federal security requirement identified in the Office of Management and Budget (OMB) Circular Number A-130, Appendix III. This phase of the

EOSDIS Risk Assessment Program is to satisfy immediate project compliance with the OMB A-130 security policy.

- **EMOS Information Technology Contingency Plan [Document Number 220-CD-200]**

This document is the Information Technology (IT) Security Contingency Plan for the EOS Flight Operations Team (FOT) located at NASA Goddard, Building 32**.** It has been developed in compliance with the NASA Procedures and Guidelines, Security of Information Technology (NPG 2810.1) and OMB Circular A-130, Appendix III, and covers all critical business functions performed by the FOT for the EOSDIS project as identified in the ECS contract agreement.

This plan establishes the procedures and identifies personnel necessary to respond to an unexpected and undesirable emergency or disaster that could prevent the FOT from providing the safe operations of the Terra, Aqua and Aura missions. This plan is applicable to the following:

| Facility | Building & Room |
|---|---|
| NASA Goddard | Building 32, 2nd Floor, EOS Operations Center (EOC) for Terra and Aqua |
| | Building 14, 2nd Floor, Backup EOS Operations Center (BEOC) for Terra and Aqua |

The EOS Operations Center (EOC) facility, located in GSFC Building 32, provides the logistical infrastructure for the support of the EOS Terra and Aqua missions. The EOC is a working facility which houses the hardware and software required for the execution of EOS mission operations. It includes the Raytheon developed EMOS ground system that provides the FOT personnel with on-line commanding and telemetry monitoring, off-line analysis and mission planning and scheduling functions. The facility also provides storage cabinets, bookcases and shelves for documentation, and a dedicated conference room for mission related meetings.

The BEOC currently supports Terra only. Raytheon anticipates expanding its capability to include Aqua prior to launch, pending NASA's approval.

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# 4. ECS Project Configurations, Acceptance, Models and COTS

This section provides the ECS Project system configurations, data models, commercial off the shelf products and system tests performed on the released software. Figure 4-1 is the system configurations, system acceptance, data models and cots products diagram. The diagram shows the documents for these particular aspects of the ECS project.

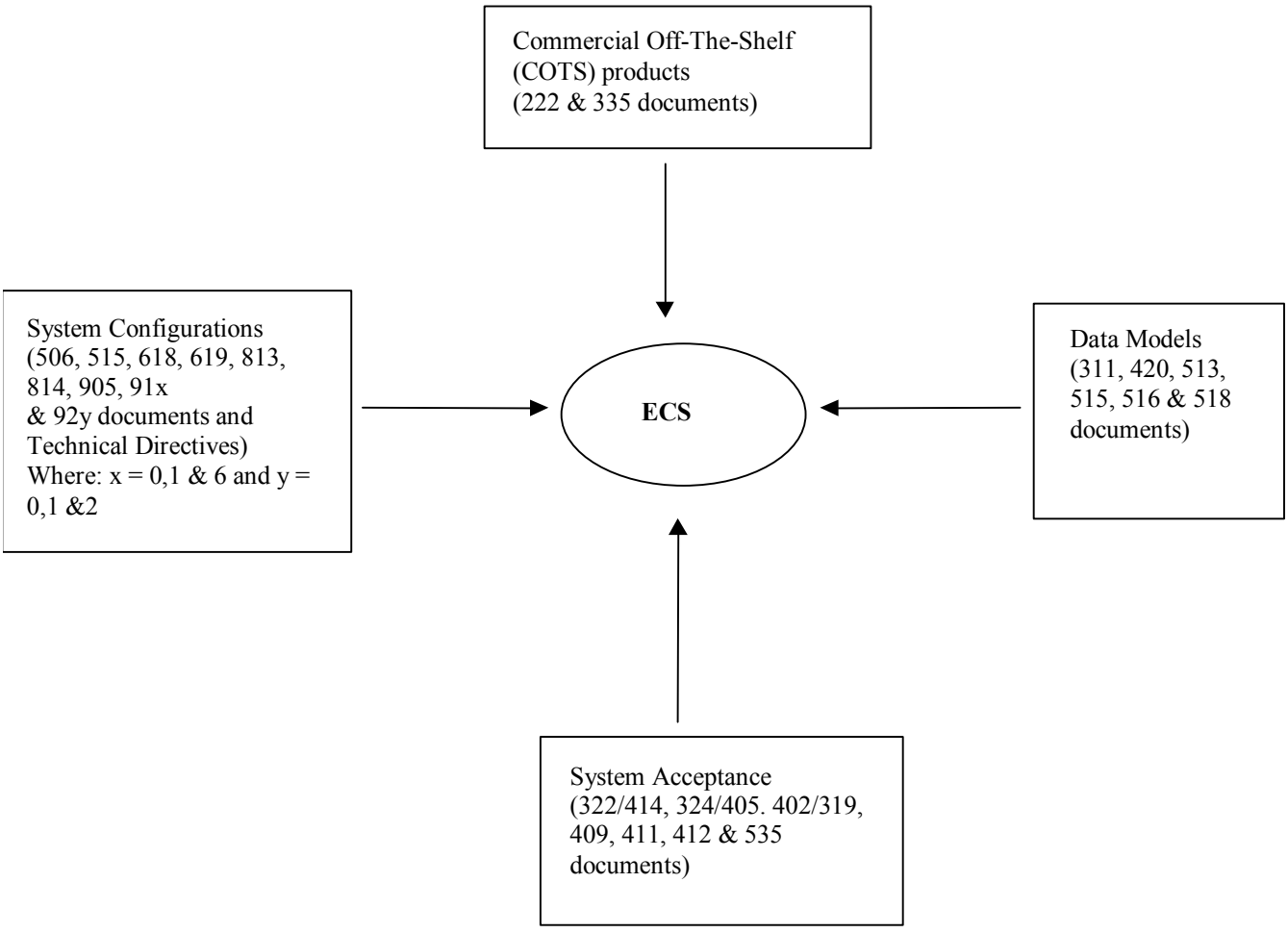


***Figure 4-1. System Configurations, Acceptance, Models and COTS products***

## 4.1 System Configurations

The system configurations are described in the various technical documents, which are baselined and under Configuration Management control. The technical documents were produced as a result of requirements derived from the F&PRS and the Configuration Management Plan, which directs the ECS Project to maintain a configuration controlled baseline. The 905, 910, 911, 916, 920, 921 and 922 series documents for the various sites are the baseline established by the ECS Project. These documents can be found in their entirety at the http://edhs1.gsfc.nasa.gov/waisdata/catalog/relacat.html,

http://edhs1.gsfc.nasa.gov/waisdata/catalog/pacat.html and the

http://pete.hitc.com/baseline/index.html web sites.

### 4.1.1 ECS System

- **Release B Replacement Parts List and Spare Parts List for the ECS Project [Document Number 618-CD-002]**

This document, Contract Data Requirements List (CDRL) item 124, whose requirements are specified in Data Item Description (DID) 618/OP3, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document provides preliminary sparing information for Release B hardware at ECS DAAC sites and the ECS Development Facility (EDF) in Upper Marlboro, Maryland. A final and updated Spare Parts List will be delivered at RRR.

The purpose of this document is to provide a preliminary spares candidate list and methodology description that identifies the line replaceable units (LRUs) and their quantities that may be provisioned as centrally stored spares or site spares at one or more Release B DAACs.

The Release B sparing methodology is provided, and its feasibility demonstrated, through a representative preliminary spares candidate list. This list contains spares to be considered by the ECS Contractor and is limited in scope to critical equipment within critical functional strings of FOS. Although Release B CDR identified equipment types, quantities and locations in the design, elements of this design may be altered before it receives Government approval. Thus, a reduced scope preliminary spares candidate list is used to demonstrate the methodology to be used for Release B sparing decisions. This methodology will be applied to all Release B finalized and approved design equipment in development of the final spares candidate list for RRR.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS Technical Direction #11, dated December 6, 1994.

- **Replacement Parts List and Spare Parts List for the ECS Project [Document Number 618-CD-100]**

This document, Contract Data Requirements List (CDRL) item 124, whose requirements are specified in Data Item Description (DID) 618/OP3, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document provides sparing information for Release 2.0 hardware at ECS sites and at the ECS Development Facility (EDF) in Upper Marlboro, Maryland.

The purpose of this document is to provide a spares list that identifies the replacement parts and their quantities that will be provisioned as spares at Release 2.0 locations for equipment being maintained by the ECS contractor.

This document identifies the initial spares the ECS contractor will purchase or lease and position at the sites to provide an immediate source of replacement parts in the event of equipment failures. Actual operations experience at the sites will determine whether the quantity and/or mix of spares need to be adjusted at a later date.

- **Replacement Parts List and Spare Parts List for the ECS Project [Document Number 618-CD-102]**

This document, Contract Data Requirements List (CDRL) item 124, whose requirements are specified in Data Item Description (DID) 618/OP3, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document provides sparing information for hardware at ECS sites and at the ECS Development Facility (EDF) in Upper Marlboro, Maryland.

The purpose of this document is to provide a spares list that identifies the replacement parts and their quantities that will be provisioned as spares for equipment being maintained by the ECS contractor.

This document identifies the initial spares the ECS contractor will purchase or lease and position at the sites to provide an immediate source of replacement parts in the event of equipment failures. Actual operations experience at the sites will determine whether the quantity and/or mix of spares need to be adjusted at a later date.

- **Release B Test and Support Equipment Requirements for the ECS Project [Document Number 619-CD-002]**

This document will identify the test and support equipment required to support the maintenance of ECS Release B equipment. It will also include the Recommended Maintenance Equipment List required by CDRL 126/DID 620, as approved by ESDIS to be merged with CDRL 125.

The Test and Support Equipment document (DID 619) is intended to identify the test and support equipment required to support the ECS design. Based upon a preliminary review of the

equipment contained in the Release B design, there is no known test, support or maintenance equipment needed to support Release B. Considering the total COTS hardware solution and the contracted maintenance support approach taken for Release B equipment, it is not expected that test, support or maintenance equipment will be required. Since failed equipment components will be replaced by the Original Equipment Manufacturers (OEMs) and not repaired by ECS personnel, there is no need for test equipment to test the replacement parts. Replacement parts provided by the OEMs and maintenance contractors will have been tested prior to receipt.

However, now that the design and specific COTS products are known, support requirements can be more thoroughly assessed. Test, support and maintenance equipment requirements identified prior to Release B RRR will be provided in the final version of this document, which is due at RRR.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS Technical Direction #11, dated December 6, 1994.

- **Planning and Scheduling Prototype Results Report [Document Number 813-RD-013]**

The purpose of the Planning and Scheduling (P & S) Prototype Results Report is to present the design and existing features of the P & S phase 4 prototype, in addition to analyze the science and flight operations community feedback to establish future priorities. Throughout the phase 4 prototyping effort, operational requirements and user feedback obtained from the phase 3 Prototype Results review (PRR) and informal phase 4 demonstrations contributed to the prototype design, which was developed into an evaluation package for presentation to the science and flight operations community at the FOS PRR, August 24, 1995. During this evaluation phase, feedback from the science and flight operations community was solicited through evaluation of informal demonstrations, meetings and audience issues and comments raised at the FOS PRR. The feedback was reviewed and incorporated into recommendations for phase 4 of the P & S prototype effort, and helped establish priorities for the overall development effort.

- **Communications Subsystem CORBA Prototype Results Phase One for the ECS Project [Document Number 813-RD-014]**

The ECS Project is relying on the Distributed Computing Environment (DCE) for its implementation of the communication infrastructure. The goal is to use the most advanced yet matured technology to build an integrated distributed system that best utilizes networked resources. DCE meets the criteria of ECS by reducing the difficulties in designing and implementing the distributed system, providing proven heterogeneous interoperability, and offering a set of basic services includes *security, name service,* and *distributed file system* required by robust and secure applications.

The Common Object Request Broker Architecture (CORBA) is a specification that supports the Object Management Architecture (OMA) of the Object Management Group (OMG).

- **ECS System Baseline Specification [Document Number 905-TDA-001]**

This technical baseline document identifies and defines all the configuration-controlled items that define ECS system release baseline during development, test, system acceptance and operations.

An overview of the baseline structure is given in Figure 1.2-1, ECS Documentation Tree.

- **ECS Host Naming Convention [Document Number 905-TDA-002]**

The purpose of this paper is to provide the standard host naming convention approved for ECS systems. This convention should be used in the naming of systems and peripherals in hardware diagrams, facility diagrams and other baseline documents. Adherence to this standard is necessary for calculating ECS function availability and downtime, which is to be used in RMA metrics reporting.

### 4.1.2 General Baseline

- **OS Version Part Numbers [Document Number 910-TDA-001]**

Contains Release B, OS Version & Part Numbers

- **Software Port Mapping [Document Number 910-TDA-002]**

A table of the ECS Software Port Mapping baseline

- **COTS Software Version B/L Report (XRP) [Document Number 910-TDA-003]**

The ECS Development Facility COTS Software Version Baseline Report

- **Site-Host Map Report (XRP) [Document Number 910-TDA-005]**

ECS wide Site-Host Subsystem Baseline Report

- **Access Control List Registry [Document Number 910-TDA-006]**

ECS Access Control List (ACL) Register. Contains ACL database name and point of contact, ACL name(s), meaning of permissions, list of permissions and meanings and notes.

- **ECS Program Register [Document Number 910-TDA-007]**

ECS program and application identifications. MSS uses program ids to monitor and control programs (e.g., with WHAZZUP and ECS Assistant), to collate logged data for a program, and as seeds for the CMI file to generate passwords. MSS uses application ids to monitor and control programs (e.g., with WHAZZUP and ECS Assistant) and to collate logged data for a program

- **Baseline Install Matrix [Document Number 910-TDA-008]**

Custom code wiring diagram.

- **ECS Operational Directory Structure [Document Number 910-TDA-009]**

ECS operational directory structure showing the various modes ECS can run and the directory structure of the COTS and custom code software

- **ECS Custom Code File Permissions [Document Number 910-TDA-011]**

The control of access to ECS custom code is important to maintain the integrity of the ECS system as a whole. This paper sets out to define a template for: 1) an account and group structure to be used to maintain and operate ECS custom code and 2) how file permissions on ECS custom code should be set

- **Drop 4P Domains and Baseline Data [Document Number 910-TDA-012]**

The purpose of this technical document is to provide the Drop 4.P Domains for the ECS Project, based on the B.0 Implementation Earth Science Data (Conceptual) Model (420-TP-015-002) design.

This technical paper represents the domains for system development, useful for developers, designers, and managers. The domains represented in this document are a practical means of assuring the consistency of domains across the system and releases.

This technical paper supersedes Appendix A, (B.0 Domains (Valids)) in the B.0 Implementation Data Model for the ECS Project (420-TP-015-002).

- **Drop 4P1 Domains and Baseline Data [Document Number 910-TDA-015]**

The purpose of this technical document is to provide the Drop 4.P1 Domains for the ECS Project, based on the B.0 Implementation Earth Science Data (Conceptual) Model (420-TP-015-002) design.

This technical paper represents the domains for system development, useful for developers, designers, and managers. The domains represented in this document are a practical means of assuring the consistency of domains across the system and releases.

This technical paper supersedes Appendix A, (B.0 Domains (Valids)) in the B.0 Implementation Data Model for the ECS Project (420-TP-015-002).

- **Drop 4PL Domains and Baseline Data [Document Number 910-TDA-016]**

The purpose of this technical document is to provide the Drop 4.PL Domains for the ECS Project, based on the B.0 Implementation Earth Science Data (Conceptual) Model (420-TP-015-002) design.

This technical paper represents the domains for system development, useful for developers, designers, and managers. The domains represented in this document are a practical means of assuring the consistency of domains across the system and releases.

This technical paper supersedes Appendix A, (B.0 Domains (Valids)) in the B.0 Implementation Data Model for the ECS Project (420-TP-015-002).

- **Base-lined Documents by Title Report [Document Number 910-TDA-017]**

ECS Product baseline, Version 2.0, Drop 4P1 by title name alphabetically

- **Base-lined Documents by Numbers Report [Document Number 910-TDA-018]**

ECS Product baseline, Version 2.0, Drop 4P1 by ascending document number

- **ESDT Baseline [Document Number 910-TDA-019]**

ESDT baseline March 2000

- **Sybase SQL Server [Document Number 910-TDA-021]**

This document supersedes the 920-TDx-010-Rev00 document, and provides the Sybase SQL Server 11.0.x configuration parameters, default values, and the DAAC specific configuration parameter values for each host. It also describes the Sybase Segment naming convention to be used at each site for assigning Sybase disk devices to databases. Future versions of this document will capture and baseline the disk devices at each DAAC, and the interface file listings at each DAAC. This is a living document and the information in it will be periodically updated and base-lined.

- **Custom Code Configuration Parameters [Document Number 910-TDA-022]**

This document describes the custom code configuration parameters. The custom code configuration parameters fall into three main categories, represented in the three sections of this document: 1) parameters stored in the registry, 2) parameters stored in flat files, 3) parameters that can be configured and stored in databases. In addition, there are parameters in the mkcfg scripts and .cfgparms files that are not yet documented.

- **Critical COTS Software List (XRP) [Document Number 910-TDA-023]**

The information in this document lists the entire ECS program COTS in the subject baseline (ECS wide Subsystem Baseline, Drop 6A). This information is derived from the 910-TDA-003 set of technical documents. There are four variants (SUN, SGI, PC, and HP) to support the ECS hosts.

- **SGI IRIX 6.5 Configuration Parameters [Document Number 910-TDA-024]**

This document describes the Kernel tunable configuration parameters for the IRIX 6.5 as recommended by SGI. These configuration parameters keep track of processes, files and system activity. This document provides the general default values and value ranges designated for the ECS IRIX 6.5 configuration. This document also defines various parameter groups, and provides descriptions of associated parameters within each group. It further identifies changes to the kernel parameters from IRIX 6.2 to IRIX 6.5. This document will be updated periodically based on need.

- **Sybase ASE 11.5.x/11.9.x Config. Parameters [Document Number 910-TDA-025]**

This document presents base-lined information on the Sybase Adaptive Server Enterprise (ASE) 11.9.x configuration parameters, and database devices and allocations. The resources utilized in

developing this document include Sybase documentation for ASE 11.9.x, and ECS Sybase Development team analysis and recommendation. This is a living document, and information within this document will be periodically updated as needed.

- **ESDT Definitions Document [Document Number 910-TDA-026]**

The table in this document represents each of the base-lined ESDTs in ClearCase. The instrument, shortname, longname, collectiondescription, CSDT implementation and CSDT type columns are extracted directly from ClearCase. The information shown in the remaining columns is defined by the ECS Science Office, utilizing information received from the Instrument Teams, the DAACs, and from ESDIS.

### 4.1.3 O/S and COTS Patch Lists

- **HP-UX B.10.20 O/S Patches [Document Number 911-TDA-001]**

Release B HP-UX 10.20 Patch List for Series 700 Machines

- **SGI IRIX 6.2 O/S Patches [Document Number 911-TDA-004]**

Release B SGI IRIX 6.2 Patch List

- **SGI IRIX 6.5 O/S Patches [Document Number 911-TDA-005]**

Release B SGI IRIX 6.5 Patch List

- **Sun Solaris 2.5.1 O/S Patches [Document Number 911-TDA-007]**

Release B0 Sun Solaris 2.5.1 Patch List. This document was updated to reflect major patch updates to the Solaris patch set. This included the recommended bundle from the vendor with additional patches for Y2000 support and other ancillary patches

- **ClearCase COTS Patches [Document Number 911-TDA-008]**

ClearCase Patch Baseline

### 4.1.4 Interfaces

- **ESDT Descriptor Template [Document Number 916-TDA-001]**

The template included is NOT an example B.0 Descriptor File. Rather, this file is a template of the structures to be used in describing an Earth Science Data Type (ESDT). The structure follows the ECS Release B.0 Science Data Model. This data model is defined in the document "Release B Science Data Processing Segment (SDPS) Database Design and Database Schema Specifications for the ECS Project" (May 1996) [311-CD-008-001], referred to as DID 311, and as modified in "B.0 Implementation Earth Science Data Model" (May 1997) [420-TP-015-001].

### 4.1.5 Sites

- **Hardware Design Diagrams [Document Numbers 920-TDx-001 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, P for PVC and 920-TDV-101 for VATC-SMC]**

Site Hardware Diagrams (As-Built)

- **Hardware-Software Map [Document Numbers 920-TDx-002 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Site Operational Subsystem Baselines listings

- **System Infrastructure [Document Numbers 920-TDx-003 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site System Infrastructure Baseline

- **Floor Plan [Document Numbers 920-TDx-004 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Site Floor Plan diagrams

- **Cable Management Plan [Document Numbers 920-TDx-005 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Site Cable Management Plan tabular list

- **Vendor Documentation [Document Numbers 920-TDx-007 where x = E for EDC, G for GSFC, L for LaRC, and N for NSIDC]**

Site Version 2.0 Documentation Lists

- **Mount Points [Document Numbers 920-TDx-008 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, P for PVC and 920-TDV-108 for VATC-SMC]**

Site Mount Points' baseline

- **DAAC HW Database Mappings [Document Numbers 920-TDx-009 where x = E or EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, P for PVC and 920-TDV-109 for VATC-SMC]**

Site Baseline Hardware / Database Mapping

- **DAAC Database Config. [Superseded by 910-TDA-021]**

- **DAAC SCSI Cable Management Plan [Document Numbers 920-TDx-012 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site SCSI Cable Management plans (wiring diagrams)

- **Custom Code Configuration Parameters [Superseded by 910-TDA-022]**

- **O/S and COTS Hardware Patch Maps [Document Numbers 920-TDx-014 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Site Hardware Patch Maps - Operational Subsystem Baseline

- **Sun Platform Unix Kernel Configuration Parameters [Document Numbers 920-TDx-015 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, P for PVC and 920-TDV-115 for VATC-SMC]**

Index of Site-Specific-General Sun Platform Parameters

- **SGI Platform Unix Kernel Configuration Parameters [Document Numbers 920-TDx-016 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Index of Site-Specific-General SGI Platform Parameters

- **HP Platform Unix Kernel Configuration Parameters [Document Numbers 920-TDx-017 where x = E for EDC, G for GSFC, L for LaRC, S for SMC, V for VATC, P for PVC and 920-TDV-101 for VATC-SMC]**

Index of Site-Specific-General HP Platform Parameters

- **Host Memory [Retired; see 920-TDx-001 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, P for PVC and 920-TDV-101 for VATC-SMC]**

- **Custom Code Baseline [Document Numbers 920-TDx-019 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Index of Site Baseline for Custom Code

### 4.1.6 Network Infrastructure

- **Network Overview Diagram [Document Number 921-TDx-001 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Site Local Area Network (LAN) Topology diagrams

- **Hardware Network Diagram [Document Number 921-TDx-002 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, P for PVC and 921-TDV-102 for VATC-SMC]**

Site Version 2.0 Hardware/Network Diagrams

- **Host IP Assignments [Document Number 921-TDx-003 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, P for PVC and 921-TDV-103 for VATC-SMC]**

Site Internet Protocol (IP) Address Assignment - Host machines

- **Network IP Assignments [Document Number 921-TDx-004 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, P for PVC and 921-TDV-104 for VATC-SMC]**

Site Internet Protocol (IP) Address Assignment - Network Hardware (devices)

- **Dual-Homed Host Static Routes [Document Number 921-TDx-005 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Network/Gateway relationships

- **Ingest Host Static Routes [Document Number 921-TDx-006 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

**Retired Document**

### 4.1.7 Disk Partitioning

- **APC Servers (Primary/Secondary) [Document Number 922-TDx-001 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site APC Server Disk and Raid Partitioning diagrams

- **Application Servers (Primary/Secondery) [Document Number 922-TDx-002 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Applications Server Disk and Raid Partitioning diagrams

- **AQA Servers [Document Number 922-TDx-003 where x = G for GSFC, L for LaRC]**

Site Release B AQA Disk Configurations

- **CSS Servers [Document Number 922-TDx-005 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site CSS Server Partitioning Diagram

- **Distribution Servers [Document Number 922-TDx-006 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site Distribution Server Disk and Raid Partitioning Diagram

- **FSMS Servers (Prim 1, Prim 2, Secondary) [Document Number 922-TDx-007 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site FSMS Server Disk and Raid Partitioning Diagram

- **Ingest Servers [Document Number 922-TDx-008 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site Ingest Client (ICL) Disk and Raid Partitioning Diagram

- **Interface Servers [Document Number 922-TDx-009 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site Interface Server Disk Partitioning Diagram

- **MSS Servers [Document Number 922-TDx-010 where x = E for EDC]**

Site MSS Server Disk and Raid Partitioning Diagram

- **MSS File Servers/CM Servers [Document Number 922-TDx-011 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Site MSS File Server and Raid Partitioning Diagram

- **OPS Workstations (Workstation1/Workstation2) [Document Number 922-TDx-012 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site Operations (OPS) Workstation (WS) or OPS WS Disk Partitioning Diagram

- **PDPS DBMS Servers [Document Number 922-TDx-013 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site Planning and Data Processing Subsystems (PDPS) Database Management System (DBMS) Servers, Planning Server or Transition Testbed Disk Partitioning Diagram

- **Queuing Servers [Document Number 922-TDx-014 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site PDPS or Queuing Server Disk Partitioning Diagram

- **Science Processors (Processors 1, 2, 3) [Document Number 922-TDx-015 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site Science Processor Disk or Science Processor Disk & Raid Partitioning Diagram

- **Science Data Servers (SDSRV) (Primary/Secondary) [Document Number 922-TDx-016 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site SDSRV Server Disk Partitioning Diagram

- **Sybase Staging Servers [Document Number 922-TDx-006 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

**Retired Document**

- **Working Storage Servers [Document Number 922-TDx-018 where x = E for EDC, V for VATC, and P for PVC]**

Working Storage (WS) Disk and Raid Partitioning or Subsetting Server Disk Partitioning Diagram

- **Science Processor 2 [Document Number 922-TDx-020 where x = L for LaRC]**

Science Processor #2 Disk and Raid Partitioning Diagram

- **AIT Workstations/DBMS Servers [Document Number 922-TDx-021 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site AIT Server Disk & Raid, AIT/WS DBMS Server or AIT DBMS Server Partitioning Diagram

- **AIT Workstations [Document Number 922-TDx-022 where x = E for EDC, G for GSFC, L for LaRC, and P for PVC]**

Site AIT WS Disk & Raid or AIT Workstation Disk Partitioning Diagram

- **Planning Management Workstations 01/02 [Document Number 922-TDx-023 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site Planning/Management, Planning Workstation, and Planning Management Workstation Disk Partitioning Diagram

- **LUT Sybase Servers [Document Number 922-TDx-024 where x = E for EDC]**

Site Look Up Table (LUT) Sybase Server Disk Partitioning Diagram

- **DEM Science Server [Document Number 922-TDx-025 where x = E for EDC]**

Site Digital Elevation Model (DEM) Science Server Partitioning Diagram

- **DBA OPS WS [Document Number 922-TDx-026 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

**No documents available on the web site.**

- **Data Spec Workstations 01/02/03 [Document Number 922-TDx-027 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site Data Spec Workstation (WS) Disk Partitioning Diagram

- **ACSLS Workstations 01/02/03 [Document Number 922-TDx-028 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Site Automated Console System for Library Services (ACSLS) Workstation Disk Partitioning Diagram

- **SSI&T Planning Servers [Document Number 922-TDx-030 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

**No documents available on the web site.**

- **Tape System Backup Servers [Document Number 922-TDx-031 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, and P for PVC]**

Site Backup Server and Backup Server Disk Partitioning Diagram

- **QA Workstations [Document Number 922-TDx-032 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site Quality Assurance (QA) Workstation (WS) Disk Partitioning Diagram

- **AIT Servers [Document Number 922-TDx-034 where x = E for EDC]**

Site Algorithm Integration and Test (AIT) Server Partitioning Diagram

- **Disk/Raid Drivers [Document Number 922-TDx-035 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, and P for PVC]**

Site Disk/Raid Driver Disk Partitioning Diagram

- **FSMS Workstation [Document Number 922-TDx-036 where x = G for GSFC]**

Site File and Storage Management System (FSMS) WS Disk Partitioning Diagram

- **Xterm Servers [Document Number 922-TDx-037 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, S for SMC, V for VATC, and P for PVC]**

Site Xterm Server Disk Partitioning Diagram

- **Landsat 7 Simulator Disk Raid [Document Number 922-TDx-038 where x = E for EDC]**

Site Landsat 7 Simulator Disk & Raid Partitioning Diagram

- **MODAPS Server Disk Raid [Document Number 922-TDx-039 where x = G for GSFC and P for PVC]**

Site MODIS Data Processing System (MODAPS) Server Disk & Raid Partitioning Diagram

- **EDOS/LPS Workstation disk [Document Number 922-TDx-040 where x = P for PVC]**

Site EOS Data and Operations System/Landsat 7 Processing System (EDOS/LPS) WS Disk Partitioning Diagram

- **Push Area Workstation Disk [Document Number 922-TDx-041 where x = P for PVC]**

Site Push Area WS Disk Partitioning Diagram

- **Console Manager Disks [Document Number 922-TDx-042 where x = E for EDC, G for GSFC, L for LaRC, and N for NSIDC]**

Site Console Manager Disk Partition Diagram

- **PDS Server Disk Partitioning [Document Number 922-TDx-043 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Product Distribution System (PDS) Server Disk Partitioning Diagram

- **Metadata Server Disk Partitioning [Document Number 922-TDx-044 where x = E for EDC, G for GSFC, L for LaRC, and V for VATC]**

Metadata Server Disk Partitioning Diagram

- **Firewall Server Disk Partitioning [Document Number 922-TDx-045 where x = E for EDC, G for GSFC, L for LaRC, N for NSIDC, V for VATC, and P for PVC]**

Firewall Server Disk Partitioning Diagram

- **DataPool Server Disk Partitioning [Document Number 922-TDx-046 where x = P for PVC]**

DataPool Server Disk Partitioning Diagram

- **FTP Server Partitioning [Document Number 922-TDx-047 where x = S for SMC]**

File Transfer Protocol (FTP) Server Partitioning Diagram

- **Knowledge Based [Document Number 922-TDx-048 where x = S for SMC]**

Knowledge Base Server Partitioning Diagram

### 4.1.8 Version Description Documents

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-001]**

This is a Version description Document (VDD) prepared using NASA-STD-2100-91 (NASA DID P500, NASA form DIDD250) as a guide. It is submitted as part of the Interim Release One (Ir1) delivery for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract number NAS5-60000.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-002]**

This document describes the configuration and the delta changes to Interim Release One (Ir1) depicted in Version 1.00 (see VDD, 814-RD-004-001) and will be referred to as Version 1.01. This attachment reflects updates to software released as of January 3, 1996.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-003]**

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration and the delta changes to Interim Release One (Ir1) depicted in Version 1.01 (see VDD, 814-RD-004-002) and will be referred to as Version 1.02. This attachment reflects updates to software released as of January 31, 1996.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-004]**

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration and the delta changes to Interim Release One (Ir1) depicted in Version 1.02 (see VDD, 814-RD-004-003) and Version 1.03 of Interim Release One (Ir1). This attachment reflects updates to software released as of April 10, 1996.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-005]**

This document (814-RD-004-005) supersedes document 814-RD-004-004, to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and dated April 10, 1996.

This document describes the delivery contents of Ir1 (also referred software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems

and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration and the delta changes to Interim Release One (Ir1) depicted in Version 1.02 (see VDD, 814-RD-004-003) and Version 1.03 of Interim Release One (Ir1). This attachment reflects updates to software released as of April 10, 1996.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-006]**

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration of Version 1.04 and the delta changes since the release of Version 1.03 of Interim Release One (Ir1). This attachment reflects updates to software released as of May 7, 1996.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-007]**

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration of Version 1.04.01 and the delta changes since the release of Version 1.04 of Interim Release One (Ir1). This attachment reflects updates to software released as of June 3, 1996.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-008]**

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration of Version 1.04.02 and the delta changes since the release of Version 1.04.01 of Interim Release One (Ir1). This attachment reflects updates to software released as of July 12, 1996.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-009]**

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration of Version 1.04.04 and the delta changes since the release of Version 1.04.02 of Interim Release One (Ir1). This attachment reflects updates to software released as of August 14, 1996.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-010]**

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration of Version 1.04.03 and the delta changes since the release of Version 1.04.04 of Interim Release One (Ir1). This attachment reflects updates to software released as of August 28, 1996.

***Note:*** Version 1.04.04 of Interim Release One (Ir1) was released prior to Version 1.04.03.

- **Interim Release One (Ir1) Version Description Document (VDD) for the ECS Project [Document Number 814-RD-004-011]**

This document describes the delivery contents of Ir1 (also referred to as *the product*) components including Commercial Off-The-Shelf (COTS) hardware and software (*Ir1 COTS*), Version 1.00 of custom Ir1 ECS software (*Ir1 Software*) and accompanying documentation.

The purpose of this document is to describe the contents of the Ir1 delivery. It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems and addresses issues such as special operating instructions, system limitations and disclaimer notices for public domain software used in the product.

This document describes the configuration of Version 1.04.05 and the delta changes since the release of Version 1.04.03 of Interim Release One (Ir1). This attachment reflects updates to software released as of October 9, 1996.

***Note:*** Version 1.04.04 of Interim Release One (Ir1) was released prior to Version 1.04.03.

- **Release B.0 Toolkit 5.2 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-008-001]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of Release B.0 Toolkit 5.2 Version 1.00. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the ECS Release B.0 Toolkit 5.2 Version 1.00 software and accompanying documentation.

- **Release B.0 Toolkit 5.2.1 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-008-002]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of Release B.0 Toolkit 5.2.1 Version 1.00. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the ECS Release B.0 Toolkit 5.2.1 Version 1.00 software and accompanying documentation.

- **Release 2.0 Toolkit 5.2.3 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-100-001]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of Release 2.0 Toolkit 5.2.3 Version 1.00. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the ECS Release 2.0 Toolkit 5.2.3 Version 1.00 software and accompanying documentation.

- **Version 2.0 SCF Toolkit 5.2.4 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-100-002]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of Version 2.0 Toolkit 5.2.4 Version 1.00. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the ECS Version 2.0 Toolkit 5.2.4 Version 1.00 software and accompanying documentation.

- **Release 5A SCF Toolkit 5.2.5 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-500]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of Release 5A SCF Toolkit 5.2.5 Version 1.00. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the ECS Release 5A SCF Toolkit 5.2.5 Version 1.00 software and accompanying documentation.

- **Release 5B SCF Toolkit 5.2.6 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-510]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of Release 5B SCF Toolkit 5.2.6 Version 1.00. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the ECS Release 5B SCF Toolkit 5.2.6 Version 1.00 software and accompanying documentation.

- **Release 6A SCF Toolkit 5.2.7 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-600]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of Release 6A SCF Toolkit 5.2.7 Version 1.00. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the ECS Release 6A SCF Toolkit 5.2.7 Version 1.00 software and accompanying documentation.

- **Version 2 Release 5A.00 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-502]**

This is a Version Description Document (VDD) prepared using NASA-STD-2100 as a guide. It is submitted as part of the ECS Version 2.0 delivery for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract number NAS5-60000.

The purpose of this document is to describe the contents and summarize the capabilities developed as the ECS Version 2.0 Release 5A.00 (referred to as 5A) delivery. 5A will be deployed to the four Distributed Active Archive Centers (DAACs) and the System Monitoring and Coordination Center (SMC) as a part of the final pre-launch delivery.

This document describes the delivery contents of the ECS Version 2.0 Release 5A.00 components including commercial off-the-shelf (COTS) hardware and software, custom software, and accompanying documentation.

- **Version 2 Release 5B.03 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-512]**

This is a Version Description Document (VDD) prepared using NASA-STD-2100 as a guide. It is submitted as part of the ECS Version 2.0 delivery for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract number NAS5-60000.

The purpose of this document is to describe the 5B.03 system release and summarize any new or additional capabilities developed for the ECS Version 2.0 Release 5B.03 (referred to as 5B) delivery. The 5B software will be deployed to the four Distributed Active Archive Centers (DAACs) and the Verification Acceptance Test Center (VATC) as a part of the Aqua-launch delivery.

This document describes the delivery contents of the ECS Version 2.0 Release 5B.03 components including commercial off-the-shelf (COTS) hardware and software, custom software, and accompanying documentation.

The delivery is annotated as 5B.03 as representative of the baseline release version from the development organization. The development approach allowed for three phases of the capability development life cycle to allow for earlier testing and functional grouping of capability development. These capability groupings were assigned target baseline versions for 5B to comprise 5B.01 and 5B.02. With NCR resolution being comprised within 5B.03, this represents the complete 5B baseline.

- **HDF-EOS Version 2.00 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-009-001]**

This is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of HDF-EOS 2.00 software. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the HDF-EOS 2.00 software and accompanying documentation.

- **HDF-EOS Version 2.1 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-009-002]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of HDF-EOS 2.1 software. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the HDF-EOS 2.1 software and accompanying documentation.

- **HDF-EOS Version 2.3 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-101-001]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of HDF-EOS 2.3 software. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating

instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the HDF-EOS 2.3 software and accompanying documentation.

- **HDF-EOS Version 2.4 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-101-002]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of HDF-EOS 2.4 software. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the HDF-EOS 2.4 software and accompanying documentation.

- **HDF-EOS Version 2.5 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-501]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of HDF-EOS 2.5 software. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the HDF-EOS 2.5 software and accompanying documentation.

- **HDF-EOS Version 2.6 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-511]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of HDF-EOS 2.6 software. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the HDF-EOS 2.6 software and accompanying documentation.

- **HDF-EOS Version 2.7 Version Description Document (VDD) for the ECS Project [Document Number 814-RD-601]**

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract number NAS5-60000.

The purpose of this VDD is to describe the contents of the delivery of HDF-EOS 2.7 software. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

This VDD specifies the delivery contents of the HDF-EOS 2.7 software and accompanying documentation.

- **Version 2 Drop 6A.04 Release for the ECS Project [Document Number 814-RD-602]**

Patch Release 6A.04 is the first patch release to the DAACs from the 6A baseline. This patch requires all DAACs to be on a baseline consistent with the IRIX operating system upgrade being complete and the 5B.07 Patch Release having been installed.

Refer to section 5 for a complete list of NCRs fixed by this patch.

This document describes the contents of the patch delivery for 6A, version 4. The document identifies the baseline and patch level of the delivery. It also provides an inventory of the delivery, list fixed NCRs, and special operating instructions where applicable.

Additional information regarding this patch is provided on CCR No. 01-0399.

### 4.1.9 Configuration Audits

- **Audit Reports for the ECS Project [Document Number 506-CD-001]**

This Audit Reports Document, Contract Data Requirements List (CDRL) item 081, whose requirements are specified in Data Item Description (DID) 506/PA3, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000).

The purpose of this document is to report on and summarize audits conducted by the Quality Office (QO) during the previous six months. The objective of this document is to inform ECS and NASA management of audit findings, recommendations and corrective actions.

This document describes the Audit Reports from the previous six months for the ECS Project.

- **Configuration Audits of the Science Data Processing Segment, Release 4, for the ECS Project [Document Number 506-CD-100]**

This Audit Report Document, Contract Data Requirements List (CDRL) item 081, whose requirements are specified in Data Item Description (DID) 506/PA3, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000).

This document provides the account of configuration audits conducted on the Science Data Processing Segment (SDPS), Release 4 configuration during the reporting period.

This document describes the Audit Report results from the accomplishment of:

- Physical Configuration Audits (PCA) of the SDPS, Release 4
- Functional Configuration Audit (FCA) of the SDPS, Release 4

Collectively these audits will be referred to as the Release 4 configuration audits. The audit period was from January 9, 1998 (initiation of hardware PCA) until June 9, 1999.

- **Configuration Audits of the Science Data Processing Segment, Release 5A for the ECS Project [Document Number 506-CD-500]**

This Audit Report Document, Contract Data Requirements List (CDRL) Item 081, whose requirements are specified in Data Item Description (DID) 506/PA3, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000).

This document provides the account of configuration audits conducted on the Science Data Processing Segment, Release 5A configuration during the reporting period.

This document describes the Audit Report results from the accomplishment of:

- Physical Configuration Audits (PCA) of the DAACs of the Science Data

  Processing Segment (SDPS), Release 5A, in preparation for SRA
- Functional Configuration Audit (FCA) of the SDPS, Release 5A

Collectively these audits will be referred to as the Release 5A configuration audits.

The audit period was from July 12, 1999 [initiation of commercial off-the-shelf (COTS) and operating system (OS) PCA until December 23, 1999.

- **Configuration Audits of the Science Data Processing Segment, Release 5B for the ECS Project [Document Number 506-CD-510]**

This Audit Report Document, Contract Data Requirements List (CDRL) Item 081, whose requirements are specified in Data Item Description (DID) 506/PA3, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000),

This document provides the account of configuration audits conducted on the Science Data Processing Segment, Release 5B configuration during the reporting period.

This document describes the Audit Report results from the accomplishment of:

- Physical Configuration Audits (PCA) of the DAACs of the Science Data Processing Segment (SDPS), Release 5B, in preparation for SRA
- Functional Configuration Audit (FCA) of the SDPS, Release 5B

Collectively these audits will be referred to as the Release 5B configuration audits.

The audit period was from June 19, 2000 through September 27, 2000 against the commercial off-the-shelf (COTS), operating system (OS) PCA, custom code, and configuration parameters, installed at the DAACs and SMC.

- **Configuration Audit Reports for the Science Data Processing Segment, Release 6A for the ECS Project [Document Number 506-CD-600]**

This Audit Report Document, Contract Data Requirements List (CDRL) Item 081, whose requirements are specified in Data Item Description (DID) 506/PA3, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000),

This document describes the Audit Report results from the accomplishment of:

- Physical Configuration Audits (PCA) of the DAACs of the Science Data Processing Segment (SDPS), Release 6A, in preparation for SRA
- Functional Configuration Audit (FCA) of the SDPS, Release 6A

Collectively these audits will be referred to as the Release 6A configuration audits.

The audit period was from April 9, 2001 through December 21, 2001 against the commercial off-the-shelf (COTS) hardware and operating system (OS), custom code, and configuration parameters, installed at the DAACs.

### 4.1.10 Technical Directives

Technical Directives (TDs) are directions from ESDIS to provide a Rough Order of Magnitude (ROM) estimate for work to be performed or directions to proceed with work needed to be done on the ECS project. There is a list of TDs dating back to calendar year 1998. These TDs can be found at the http://pete.hitc.com/baseline/index.html web site. There is a button there for technical directives and by clicking on this button you can get to this list. Any directive on the list can be viewed by clicking the individual directive.

## 4.2 System Acceptance

The System Acceptance section of this document identifies the documents used to provide the plans for acceptance of the ECS at the designated sites. These documents can be found in their entirety at the http://edhs1.gsfc.nasa.gov/waisdata/catalog/ir1cat.html, http://edhs1.gsfc.nasa.gov/waisdata/catalog/atocat.html web site.

- **Interim Release 1 Integration and Test Plan and Procedures for the ECS Project [Document Numbers 322-CD-001/414-CD-001]**

This document is submitted as required by the Contract Data Requirements List (CDRL) item 054, DID322/414 whose requirements are specified as a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). This document is a final contract deliverable in accordance with the follow-up letter to 995-TR-951-057, dated July 19, 1995 (Re: CDRL Items DID 319/DV1, DID 402/VE1, DID 322/DV3 and DID 414/VE1).

This Ir1 Integration and Test Plan and Procedures document describes the test, review and analysis effort to be conducted by the Ir1 I&T organization. This document presents the overall processes and activities associated with verifying the release segment and system integration and test phases. The test plan provides an outline of the activities to be performed for Ir1 I&T while the test procedures provide more detailed instructions for verification of the Ir1 release.

This document defines the plan and procedures for integration, test and verification of the TRMM Infrastructure Release, referred to a Lr1, for ECS. There is a separate document detailing the test activities for each proceeding release. The Ir1 Integration and Test Plan and Procedures apply to segment and system level verification activities. This document provides procedures to verify that the ECS complies with the Ir1 Level 3 Requirements-by-Release (RBRs) and Level 4 Functional Requirements. The roles and activities of the Ir1 Integration and Test Organization are described and high level schedules for performing these activities are addressed.

This document reflects the Technical Baseline submitted via contract correspondence number ECS 194-00343.

- **Interim Release 1 Integration and Test Report for the ECS Project [Document Numbers 324-CD-001/405-CD-001]**

This document is submitted as required by the Contract Data Requirements List (CDRL) items 056 (DID324/DV3) and 067 (DID 405/DV3), whose requirements are specified as a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). This document is a final contract deliverable in accordance with the follow-up letter to 995-TR-951-335.

This Ir1 Test Report document shows the results of the test and analysis effort that was conducted by the Ir1 I&T organization. This document presents the overall processes and activities that were associated with verifying the release segment and system integration and test phases.

This document consists of the test reports for integration, test, and verification of the TRMM Infrastructure Release, referred to a Ir1, for ECS. The Ir1 test reports document applies to segment and system level verification activities for EDF, GSFC, LaRC and EDC sites only. This document provides a list of the mapping from requirements to test cases to verify that the ECS complies with the Ir1 Level 3 Requirements-by-Release (RBRs) and Level 4 Functional Requirements. This document consists of those Test Procedures that were revised after the submittal of DID 322/414 document.

- **Release B System and Segment Integration and Test Plan for the ECS Project [Document Numbers 402-CD-003/319-CD-006]**

The System/Segments Integration and Test Plan satisfies the requirements for CDRL items 064, DID 402/VE1 (System/Segments Integration and Test Plan) and 054, DID 319?DV1 (Segment Integration and Test Plan) as specified in the Statement of Work, as deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The ECS System/Segments Integration and Test Plan (SITP) for Release B documents tests, test methodology, schedules, dependencies and the thread/build plan. This document presents the overall objectives/descriptioins for the thread/build plans based on the level 3 and levl4 requirements for Science Data Processing segment (SDPS) and Communications and System Management Segment (CSMS). This test plan provides the functions and capabilities to be verified for Release B and is later used to prepare test procedures, which provide more detailed instructions for verifying requirements.

The ECS SITP for Release B defines the plan for integration, test and verification of ECS configuration items and verifies that ECS complies with the Functional and Performance Requirements Specification, Interface Requirements Documents, Level3 functional requirements (system), Level 4 functional requirements (segment) and the ECS design specifications. The roles and activities of the System/Segments Integration and Test Organization are described and schedules for performing Release B activities are provided. Changes and additions to spacecraft and instruments for Release B will be incorporated in later versions of this document.

- **ECS Overall System Acceptance Test Plan for Release B [Document Number 409-CD-002]**

This document is generated under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000 approved at the ECS Office Management level. This document is also a required deliverable under the ECS, contract NAS5-60000.

The System Acceptance Test Plan (ATP) specifies how the independent acceptance testing of the ECS for Release B is accomplished. It defines the plan used to formally verify the Release B meets the specified operational, functional, performance and interface requirements. Further, the ATP ensures the integrated system produces a full functional environment for ECS operations. The ATP also serves as a guide in the development of the ECS System Acceptance Test Procedures (DID 411/VE1) document.

This Release B ECS Overall System Acceptance Test Plan (ATP) for the ECS Project describes in greater detail the Independent Acceptance Test Organization's (IATO) test plan, which was outlined in the Acceptance Testing Management Plan for the ECS Project (DID 415/VE1). The plan describes the strategy for verifying baseline requirements documented in the Verification Specification for the ECS Project (DID 403/VE1). The ATP provides the basis for development of the ECS System Acceptance Test Procedures (DID 411/VE1) and the Release B ECS System Acceptance Test Report (DID 412/VE2).

This ATP describes how the system acceptance testing of the ECS for Release B is conducted by the IATO. It describes the ECS formal Release B tests scheduled for use at the following facilities: EOS Operations Center (EOC); System Monitoring and Coordination Center (SMC); Goddard Space Flight Center (GSFC); Marshall Space Flight Center (MSFC); Langley Research Center (LaRC); National Snow and Ice Data Center (NSIDC); Jet Propulsion Laboratory (JPL); Alaska Synthetic Aperture Radar (SAR) Facility (ASF); Oak Ridge National Laboratory (ORNL) and the EROS Data Center (EDC).

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **ECS Overall Acceptance Test Plan for Release 5A [Document Number 409-CD-500]**

The Acceptance Test Plan (ATP), Contract Data Requirements List (CDRL) item 069, whose requirements are specified in Data Item Description (DID) 409/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). The Release 5A ECS System Acceptance Test Plan describes the approach System Verification and Acceptance Testing (SVAT) will take to verify functional components and error conditions. The Release 5A ECS System Acceptance Test Plan contains the overall acceptance test plan, processes, procedures and schedules used to verify Release 5A.

The purpose of the Release 5A ECS Acceptance Test Plan is to provide an overview of the overall acceptance test plan, process and schedule used to formally verify that the ECS Release 5A meets all functional components and error conditions specified by ESDIS in the Feature Acceptance Tickets (FATs). The FATs group related features and provides Functional Components that must be verified for system acceptance.

The Release 5A system will provide additional capabilities above those provided in the Drop 4PX/4PY system. The new high level functionality provided by 5A includes the following:

- External interfaces for Orbit data from FDS; DAO ingest; Ingest, and archival of SAGE III Level 0 data from MOC; Ingest and archive of metadata and browse from Landsat 7 IGSs; Ingest of ASTER DEM 14K data
- Ingest and archival of SAGE III level 0 data from SCF
- High Volume ingest from external processing systems
- Cross-DAAC unsubsetted data transfer to support a Cross-DAAC production

- COTS upgrade for Y2K compliance

In addition to the new capabilities introduced in Release 5A, the system will include modifications to address certain NCRs that have been written against the ECS system. The NCR fixes that will be provided in the Release 5A system are identified in the 5A Science System Release Plan for the ECS Project.

- **ECS Overall Acceptance Test Plan for Release 5B [Document Number 409-CD-510]**

This Acceptance Test Plan (ATP), Contract Data Requirements List (CDRL) item 069, whose requirements are specified in Data Item Description (DID) 409/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000. The Release 5B ECS System Acceptance Test Plan describes the approach System Verification and Acceptance Testing (SVAT) will take to verify applicable 5B requirements. The Release 5B ECS System Acceptance Test Plan contains the overall acceptance test plan, processes, test cases and schedules used to verify Release 5B.

The purpose of the Release 5B ECS System Acceptance Test Plan is to provide an overview of the overall acceptance test plan, process and schedule. The Test Plan is used to formally verify the ECS Release 5B meets all requirements as delineated in the 5B Science System Release Plan, 334-CD-510-001, for the ECS Project.

The Release 6A system will provide additional capabilities above those provided in the Release 5B system. The new major capabilities, provided by the Release 6A, are delineated in paragraph 3.1.2. In addition to the new capabilities introduced in Release 6A, the system will include modifications to address certain NCRs that have been written during prior releases against the ECS System.

- **ECS Overall Acceptance Test Plan for Release 6A [Document Number 409-CD-600]**

This Acceptance Test Plan (ATP), Contract Data Requirements List (CDRL) item 069, whose requirements are specified in Data Item Description (DID) 409/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000. The Release 6A ECS System Acceptance Test Plan describes the approach System Verification and Acceptance Testing (SVAT) will take to verify applicable 6A Acceptance Criteria. The Release 6A ECS System Acceptance Test Plan contains the overall acceptance test plan, processes, test cases and schedules used to verify Release 6A.

The purpose of the Release 6A ECS System Acceptance Test Plan is to provide an overview of the overall acceptance test philosophy, process and schedule. The Test Plan is used to formally verify that the ECS Release 6A satisfies all criteria based on requirements as delineated in the 6A Science System Release Plan for the ECS Project, 334-CD-600-002.

The Release 6A system provides additional capabilities above those provided in the Release 5B system. New major capabilities, provided by the Release 6A are delineated in paragraph 3.1.2. In addition to the new capabilities introduced in Release 6A, the system will include modifications to address certain NCRs that have been written during prior releases against the ECS System.

- **ECS Overall Acceptance Test Plan for Release 6B [Document Number 409-CD-610]**

This Acceptance Test Plan (ATP), Contract Data Requirements List (CDRL) item 069, whose requirements are specified in Data Item Description (DID) 409/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000. The Release 6B ECS System Acceptance Test Plan describes the approach Test Engineering (TE) will take to verify applicable 6B Acceptance Criteria. The Release 6B ECS System Acceptance Test Plan contains the overall acceptance test plan, processes, test cases and schedules used to verify Release 6B.

The purpose of the Release 6B ECS System Acceptance Test Plan is to provide an overview of the overall acceptance test philosophy, process and schedule. The Test Plan is used to formally verify that the ECS Release 6B satisfies all criteria based on requirements as delineated in the 6B Science System Release Plan for the ECS Project, 334-CD-610-002.

The Release 6B system provides additional capabilities above those provided in the Release 6A system. New major capabilities, provided by the Release 6B are delineated in paragraph 3.1.2. In addition to the new capabilities introduced in Release 6B, the system will include modifications to address certain NCRs that have been written during prior releases against the ECS System.

- **ECS System Acceptance Test Procedures - Volume 1 SMC Procedures [Document Number 411-CD-001]**

This Acceptance Test Procedures (ATPr), Contract Data Requirements List (CDRL) item 070, whose requirements are specified in Data Item Description (DID) 411/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000. The Release A ECS System Acceptance Test Procedures describe the approach Independent Acceptance Test Organization (IATO) takes to verify level 3 ECS requirements. The Release A ECS System Test Procedures Volumes 1-5 contain the step by step test procedures for each Release A site.

The purpose of the Release A ECS System Acceptance Test Procedures is to define the procedures used to formally verify that the ECS Release A meets all specified level 3, operational, functional, performance and interface requirements. These procedures define the specific objectives, event sequences, support requirements, configuration identification, and testing procedures for each acceptance test or series of test to be performed during acceptance testing of the ECS.

Release A of ECS supports the early operational stages of the Tropical Rainfall Measuring Mission (TRMM). Release A follows an earlier ECS delivery, referred to as Interim Release 1 (Ir1), which provided certain enterprise infrastructure in preparation for subsequent deliveries. Ir1 also provided science software integration and testing capabilities. The infrastructure delivery of ECS involves three Distributed Active Archive Centers (DAACs)-- these being the Goddard Space Flight center (GSFC), the Langley Research Center (LaRC) and the EROS Data Center (EDC). Even though only two of the DAACs (GSFC and LaRC) directly support the TRMM effort, all three are updated at Release A. This simplifies configuration management and allows for interface testing for future ECS releases. For Release A, the Ir1 configurations of

GSFC and LaRC DAACs are upgraded with major hardware and software deliveries. The EDC, which is not part of the TRMM operations, receives minor upgrade for Release A to support interface testing. Additionally, Release A provides for overall ECS system monitoring at the System Monitoring and Coordination Center (SMC) and core flight operations functionality at the EOS Operation Center (EOC) for EOS spacecraft.

This document comprises the IATO's test procedures for Release A. It contains the step-by-step procedures for the implementing each formal acceptance test, including the detailed procedures for data reduction and analysis of test results.

- **ECS System Acceptance Test Procedures - Volume 2 GSFC Procedures [Document Number 411-CD-002]**

This Acceptance Test Procedures (ATPr), Contract Data Requirements List (CDRL) item 070, whose requirements are specified in Data Item Description (DID) 411/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The Release A ECS System Acceptance Test Procedures describe the approach the Independent Acceptance Test Organization (IATO) takes to verify level 3 ECS requirements. The Release A ECS System Test Procedures - Volumes 1-5 contain the step by step test procedures for each Release A site.

The purpose of the Release A ECS System Acceptance Test Procedures is to define the procedures used to formally verify that the ECS Release A meets all specified level 3, operational, functional, performance and interface requirements. These procedures define the specific objectives, event sequences, support requirements, configuration identification, and testing procedures for each acceptance test or series of test to be performed during acceptance testing of the ECS.

Release A of ECS supports the early operational stages of the Tropical Rainfall Measuring Mission (TRMM). Release A follows an earlier ECS delivery, referred to as Interim Release 1 (Ir1), which provided certain enterprise infrastructure in preparation for subsequent deliveries. Ir1 also provided science software integration and testing capabilities. The infrastructure delivery of ECS involves three Distributed Active Archive Centers (DAACs)-- these being the Goddard Space Flight center (GSFC), the Langley Research Center (LaRC) and the EROS Data Center (EDC). Even though only two of the DAACs (GSFC and LaRC) directly support the TRMM effort, all three are updated at Release A. This simplifies configuration management and allows for interface testing for future ECS releases. For Release A, the Ir1 configurations of GSFC and LaRC DAACs are upgraded with major hardware and software deliveries. The EDC, which is not part of the TRMM operations, receives minor upgrade for Release A to support interface testing. Additionally, Release A provides for overall ECS system monitoring at the System Monitoring and Coordination Center (SMC) and core flight operations functionality at the EOS Operation Center (EOC) for EOS spacecraft.

This document comprises the IATO's test procedures for Release A. It contains the step-by-step procedures for the implementing each formal acceptance test, including the detailed procedures for data reduction and analysis of test results.

- **ECS System Acceptance Test Procedures - Volume 3 Earth Observing System (EOS) Operations Center (EOC) Procedures [Document Number 411-CD-003]**

This Acceptance Test Procedures (ATPr), Contract Data Requirements List (CDRL) item 070, whose requirements are specified in Data Item Description (DID) 411/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000.

The Release A ECS System Acceptance Test Procedures describe the approach the Independent Acceptance Test Organization (IATO) takes to verify level 3 ECS requirements. The Release A ECS System Test Procedures - Volumes 1-5 contain the step by step test procedures for each Release A site.

The purpose of the Release A ECS System Acceptance Test Procedures is to define the procedures used to formally verify that the ECS Release A meets all specified level 3, operational, functional, performance and interface requirements. These procedures define the specific objectives, event sequences, support requirements, configuration identification, and testing procedures for each acceptance test or series of test to be performed during acceptance testing of the ECS.

Release A of ECS supports the early operational stages of the Tropical Rainfall Measuring Mission (TRMM). Release A follows an earlier ECS delivery, referred to as Interim Release 1 (Ir1), which provided certain enterprise infrastructure in preparation for subsequent deliveries. Ir1 also provided science software integration and testing capabilities. The infrastructure delivery of ECS involves three Distributed Active Archive Centers (DAACs)-- these being the Goddard Space Flight center (GSFC), the Langley Research Center (LaRC) and the EROS Data Center (EDC). Even though only two of the DAACs (GSFC and LaRC) directly support the TRMM effort, all three are updated at Release A. This simplifies configuration management and allows for interface testing for future ECS releases. For Release A, the Ir1 configurations of GSFC and LaRC DAACs are upgraded with major hardware and software deliveries. The EDC, which is not part of the TRMM operations, receives minor upgrade for Release A to support interface testing. Additionally, Release A provides for overall ECS system monitoring at the System Monitoring and Coordination Center (SMC) and core flight operations functionality at the EOS Operation Center (EOC) for EOS spacecraft.

This document comprises the IATO's test procedures for Release A. It contains the step-by-step procedures for the implementing each formal acceptance test, including the detailed procedures for data reduction and analysis of test results.

- **ECS System Acceptance Test Procedures - Volume 4 LaRC Procedures [Document Number 411-CD-004]**

This Acceptance Test Procedures (ATPr), Contract Data Requirements List (CDRL) item 070, whose requirements are specified in Data Item Description (DID) 411/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The Release A ECS System Acceptance Test Procedures describe the approach Independent Acceptance Test Organization (IATO) takes to verify level 3 ECS requirements. The Release A ECS System Test Procedures - Volumes 1-5 contain the step by step test procedures for each Release A site.

The purpose of the Release A ECS System Acceptance Test Procedures is to define the procedures used to formally verify that the ECS Release A meets all specified level 3, operational, functional, performance and interface requirements. These procedures define the specific objectives, event sequences, support requirements, configuration identification, and testing procedures for each acceptance test or series of test to be performed during acceptance testing of the ECS.

Release A of ECS supports the early operational stages of the Tropical Rainfall Measuring Mission (TRMM). Release A follows an earlier ECS delivery, referred to as Interim Release 1 (Ir1), which provided certain enterprise infrastructure in preparation for subsequent deliveries. Ir1 also provided science software integration and testing capabilities. The infrastructure delivery of ECS involves three Distributed Active Archive Centers (DAACs)-- these being the Goddard Space Flight center (GSFC), the Langley Research Center (LaRC) and the EROS Data Center (EDC). Even though only two of the DAACs (GSFC and LaRC) directly support the TRMM effort, all three are updated at Release A. This simplifies configuration management and allows for interface testing for future ECS releases. For Release A, the Ir1 configurations of GSFC and LaRC DAACs are upgraded with major hardware and software deliveries. The EDC, which is not part of the TRMM operations, receives minor upgrade for Release A to support interface testing. Additionally, Release A provides for overall ECS system monitoring at the System Monitoring and Coordination Center (SMC) and core flight operations functionality at the EOS Operation Center (EOC) for EOS spacecraft.

This document comprises the IATO's test procedures for Release A. It contains the step-by-step procedures for the implementing each formal acceptance test, including the detailed procedures for data reduction and analysis of test results.

- **ECS System Acceptance Test Procedures - Volume 5 EDC Procedures [Document Number 411-CD-005]**

This Acceptance Test Procedures (ATPr), Contract Data Requirements List (CDRL) item 070, whose requirements are specified in Data Item Description (DID) 411/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The Release A ECS System Acceptance Test Procedures describe the approach Independent Acceptance Test Organization (IATO) takes to verify level 3 ECS requirements. The Release A ECS System Test Procedures - Volumes 1-5 contain the step by step test procedures for each Release A site.

The purpose of the Release A ECS System Acceptance Test Procedures is to define the procedures used to formally verify that the ECS Release A meets all specified level 3, operational, functional, performance and interface requirements. These procedures define the specific objectives, event sequences, support requirements, configuration identification, and

testing procedures for each acceptance test or series of test to be performed during acceptance testing of the ECS.

Release A of ECS supports the early operational stages of the Tropical Rainfall Measuring Mission (TRMM). Release A follows an earlier ECS delivery, referred to as Interim Release 1 (Ir1), which provided certain enterprise infrastructure in preparation for subsequent deliveries. Ir1 also provided science software integration and testing capabilities. The infrastructure delivery of ECS involves three Distributed Active Archive Centers (DAACs)-- these being the Goddard Space Flight center (GSFC), the Langley Research Center (LaRC) and the EROS Data Center (EDC). Even though only two of the DAACs (GSFC and LaRC) directly support the TRMM effort, all three are updated at Release A. This simplifies configuration management and allows for interface testing for future ECS releases. For Release A, the Ir1 configurations of GSFC and LaRC DAACs are upgraded with major hardware and software deliveries. The EDC, which is not part of the TRMM operations, receives minor upgrade for Release A to support interface testing. Additionally, Release A provides for overall ECS system monitoring at the System Monitoring and Coordination Center (SMC) and core flight operations functionality at the EOS Operation Center (EOC) for EOS spacecraft.

This document comprises the IATO's test procedures for Release A. It contains the step-by-step procedures for the implementing each formal acceptance test, including the detailed procedures for data reduction and analysis of test results.

- **ECS System Acceptance Test Report for Release 4 [Document Number 412-CD-110]**

This Acceptance Test Report, Contract Data Requirement List (CDRL) item 071, whose requirements are specified in Data Item Description (DID) 412/VE2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000.

The ECS System Acceptance Test Report document contains the results of the tests executed to verify that the Release 4 installed at Goddard Space Flight Center (GSFC), Langley Research Center (LaRC), and EROS Data Center (EDC) Distributed Active Archive Centers (DAACs) satisfies the functional components, error conditions, and performance constraints delivered with these drops.

The purpose of the Release 4 ECS System Acceptance Test Report is to detail the results of the tests used to formally verify that the Release 4 meets all specified functional components, error conditions and performance constraints.

Release 4 includes the functional capabilities, features and services to support pre-launch and launch support activities. Release 4 contains the software to support all external operational interfaces and the associated EOS Mission Integration Testing and Ground System Integration Testing that is performed for AM-1 and Landsat-7.

Release 4 was acceptance tested at three DAACs prior to launch of the instruments supported by these DAACs. This schedule is intended to support the EOS Ground System (EGS) Integration and Mission Integration activities defined in the Earth Science Data & Information System Master Schedule.

This document contains the results of the System Verification and Acceptance Test (SVAT) organization's acceptance tests for Release 4 as of the conduct of the Release Readiness Review (RRR) held on June 9, 1999. Results include the number of functional components tested, not tested, verified, verified with work-arounds and not verified for each test case executed. The status of error condition and performance constraint testing is also reported. The number of Nonconformance Reports (NCRs) opened and closed during the testing is also included in this document.

- **ECS System Acceptance Test Report for Release 5A [Document Number 412-CD-500]**

This Acceptance Test Report, Contract Data Requirement List (CDRL) item 071, whose requirements are specified in Data Item Description (DID) 412/VE2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000.

The ECS System Acceptance Test Report document contains the results of the tests executed to verify that the Release 5A satisfies the functional components, error conditions, and performance constraints delivered with this drop.

The purpose of the Release 5A ECS System Acceptance Test Report is to detail the results of the tests used to formally verify that the Release 5A meets all specified functional components, error conditions and performance constraints.

Release 5A includes the functional capabilities, features, and services to support pre-launch and launch support activities. Release 5A contains the software to support all external operational interfaces and the associated EOS Mission Integration Testing and Ground System Integration Testing that is performed for AM-1 and Landsat-7.

Release 5A was acceptance tested at the Verification and Acceptance Test Center (VATC) prior to launch of the Terra (AM-1) instruments. This schedule is intended to support the EOS Ground System (EGS) Integration and Mission Integration activities defined in the Earth Science Data & Information System Master Schedule.

This document contains the results of the System Verification and Acceptance Test (SVAT) organization's acceptance tests for Release 5A as of the conduct of the Consent to Ship Review (CSR) held on July 21, 1999. Results include the number of functional components tested, not tested, verified, and not verified for each test case executed. The status of error condition and performance constraint testing is also reported. The number of Nonconformance Reports (NCRs) opened and closed during the testing is also included in this document.

- **ECS System Acceptance Test Report for Release 5B [Document Number 412-CD-510]**

This Acceptance Test Report, Contract Data Requirement List (CDRL) item 071, whose requirements are specified in Data Item Description (DID) 412/VE2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000.

The ECS System Acceptance Test Report document contains the results of the tests executed to verify that the Release 5B satisfies the functional components, error conditions, and performance constraints delivered with this release.

The purpose of the ECS Science Acceptance Test Report for Release 5B is to detail the results of the tests used to formally verify that Release 5B meets all specified functional components, error conditions and performance constraints.

Release 5B includes the functional capabilities and services to provide Terra (AM-1) and Landsat 7 enhanced post-launch capabilities. Release 5B also contains the software to support all external operational interfaces and the associated EOS Mission Integration Testing and Ground System Integration Testing performed for Aqua (PM-1).

Release 5B was acceptance tested at the Verification and Acceptance Test Center (VATC) and Performance Verification Center (PVC) subsequent to launch of the Terra (AM-1) and Landsat 7 instruments but prior to the launch of the Aqua (PM-1) instruments. This schedule is intended to support the EOS Ground System (EGS) Integration and Mission Integration activities defined in the Earth Science Data & Information System Master Schedule.

This document contains the results of the Test Engineering (TE) organization's formal Acceptance Tests as well as the Performance and Load Tests of the Release 5B Consent to Ship Review (CSR) held on May 11, 2000 plus post CSR updates. For the formal Acceptance Tests, the results include the number of functional components, error conditions, and performance constraints tested, not tested, verified, and not verified for each test case executed. For the Performance and Load Tests, test results as measured against the 24-hour workload specifications for the GSFC and EDC Distributed Active Archive Centers (DAACs) are provided. The number of Nonconformance Reports (NCRs) opened and closed during the testing is also included in this document.

- **ECS Science Acceptance Test Report for Release 6A [Document Number 412-CD-600]**

This Acceptance Test Report, Contract Data Requirement List (CDRL) item 071, whose requirements are specified in Data Item Description (DID) 412/VE2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Contract NAS5-60000.

The ECS System Acceptance Test Report document contains the results of the tests executed to verify that Release 6A satisfies the functional components, error conditions, and performance constraints delivered with this Release.

The purpose of the ECS Science Acceptance Test Report for Release 6A is to detail the results of the tests used to formally verify that Release 6A (as well as 5BP) meets all specified functional components, error conditions and performance constraints.

Release 6A includes the functional capabilities and services to provide Terra (AM-1) enhanced post-launch capabilities and Aqua (PM-1) pre-launch capabilities.

Release 6A was acceptance tested at the Verification and Acceptance Test Center (VATC) and Performance Verification Center (PVC) subsequent to launch of the Terra instruments, but prior

to the launch of the Aqua instruments. This schedule is intended to support the EOS Ground System (EGS) Integration and Mission Integration activities defined in the Earth Science Data & Information System Master Schedule.

This document contains the results of the System Integration and Test (SI&T) organization's formal Acceptance Tests as well as the Performance and Load Tests as of the Release 6A Consent to Ship Review (CSR) held on April 17, 2001 plus post-CSR updates. For the formal Acceptance Tests, the results include the number of functional components, error conditions, and performance constraints tested, not tested, verified, and not verified for each test case executed. For the Performance and Load Tests, test results as measured against the 24-hour workload specifications for the GSFC and EDC Distributed Active Archive Centers (DAACs) are provided. The number of Nonconformance Reports (NCRs) opened and closed during the testing is also included in this document.

Similar information for the Release 5BP is also included in this Release 6A document, since 5BP was not addressed in the 5B version of the Acceptance Test Report.

- **Science Data Processing Segment (SDPS) Acceptance Data Package (Release 4) [Document Number 535-CD-100]**

This document is the SDPS Release 4 Acceptance Data Package for the ECS Project, which is item 108 on the Contract Data Requirements List (CDRL) and defined by the Data Item Description (DID) 535/PA1 under contract NAS5-60000.

This document includes by reference the information that makes up the SDPS Release 4 Acceptance Data Package. Its purpose is to provide high level information regarding the content and status of the SDPS at the time of the RRR for Release 4, including acceptance testing results, configuration status, and any open action items from RRR, the current status of known problems and to identify release related documentation.

This document identifies the SDPS Acceptance Data Package for Release 4 for the ECS Project.

- **Science Data Processing Segment (SDPS) Acceptance Data Package (Release 5A) [Document Number 535-CD-500]**

This document is the SDPS Release 5A Acceptance Data Package for the ECS Project, which is item 108 on the Contract Data Requirements List (CDRL) and defined by the Data Item Description (DID) 535/PA1 under contract NAS5-60000.

This document includes by reference the information that makes up the SDPS Release 5A Acceptance Data Package. Its purpose is to provide high level information regarding the content and status of the SDPS at the time of the Consent to Ship Review (CSR) for Release 5A, including acceptance testing results, configuration status, and any open action items from CSR, the current status of known problems and to identify release related documentation.

This document identifies the SDPS Acceptance Data Package for Release 5A of the ECS Project.

- **Science Data Processing Segment (SDPS) Acceptance Data Package (Release 5B) [Document Number 535-CD-510]**

This document is the Science Data Processing Segment (SDPS) Release 5B Acceptance Data Package for the ECS Project, which is item 108 on the Contract Data Requirements List (CDRL) and defined by the Data Item Description (DID) 535/PA1 under contract NAS5-60000.

This document includes by reference the information that makes up the ECS SDPS Release 5B Acceptance Data Package. Its purpose is to provide high level information regarding the content and status of the SDPS at the time of the Site Readiness Review (SRA) for Release 5B. This information includes acceptance testing results, configuration status, and open action items from SRA, the current status of known problems, and identification of all release related documentation.

This document identifies the SDPS Acceptance Data Package for Release 5B of the ECS Project.

- **Science Data Processing Segment (SDPS) Acceptance Data Package (Release 6A) [Document Number 535-CD-600]**

This document is the Science Data Processing Segment (SDPS) Release 6A Acceptance Data Package for the ECS Project, which is item 108 on the Contract Data Requirements List (CDRL) and defined by the Data Item Description (DID) 535/PA1 under contract NAS5-60000.

This document includes by reference the information that makes up the ECS SDPS Release 6A Acceptance Data Package. Its purpose is to provide high-level information regarding the content and status of the SDPS at the time of the Site Readiness Review (SRA) for Release 6A. This information includes acceptance testing results, configuration status, and open action items from SRA, the current status of known problems, and identification of all release related documentation.

This document identifies the SDPS Acceptance Data Package for Release 6A of the ECS Project.

## 4.3 Data Models

- **Release B Availability Models/Predictions for the ECS Project [Document Number 515-CD-002]**

This Availability Models/Predictions Report, Contract Data Requirements List (CDRL) item 088, whose requirements are specified in Data Item Description (DID) 515/PA2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The purpose of this document is to present mathematical models and techniques applied by the ECS contractor to analytically demonstrate compliance with the ECS Functional and Performance Requirements Specification for all required functional availabilities. The modeling results are expressed in terms of Mean Time Between Maintenance (MTBM), Mean Down Time (MDT) and operational availability ($A_0$). The system availability modeling effort was initiated early in the ECS Design phase and will continue throughout the operational phase to analyze

effects of design changes occurring as a result of sustaining engineering activity, maintenance activities or aging. Availability models will be updated with information resulting from reliability/maintainability predictions as well as design or operational changes (including any changes in mission parameters or operational constraints).

This report incorporates the Government's comments received by the Data Management Office (DMO) on December 6, 1995 in technical report No. 995-TR-951-175. This report also provides updates to the Release B Incremental Design Review (IDR) submittal, which was generated at the ECS Release B IDR time frame. The purpose of this submittal is to reflect the current ECS architecture and to present detailed assessments of the ECS and its functions operational availabilities ($A_0$) and Mean Down Time (MDT) as stated in the ECS Functional and Performance Requirements Specification for the ECS Project, 423-41-02. These assessments were based on analytical predictions and probabilistic determination of the ECS hardware Configuration Items (HWCIs) as presented at the Release B Critical design Review (CDR) time frame. These HWCIs represent the Science Data Processing Segment (SDPS) and Communications and System Management Segment (CSMS) Release B CDR configuration.

The SDPS and CSMS functional availability calculations are Distributed Active Archive Center (DAAC) site specific. The applicable DAAC sites for the Release B CDR for SDPS and CSMS are: Goddard Space Flight Center (GSFC), Earth Resources Observation System (EROS) Data Center (EDC), Langley Research center (LaRC), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC), Oak Ridge National Laboratory (ORNL) and Alaska Synthetic Aperture Radar (SAR) Facility.

The availability modeling effort includes the development of hardware functional and reliability block diagrams or strings for each segment and function of the ECS. Mathematical models were developed for each block diagram with the underlying ground rules and assumptions. The ECS availability models have been implemented on Excel 5.0 workbooks. These models consist of a series of linked workbooks and workbook pages that accept user's inputs, calculate individual equipment/subsystem availability, estimate overall functional availability, display the results in graphical and tabulated formats and allow the exercise of "what-if" scenarios. This modeling process is described in detail in section 7.0 of the report.

Analytical results for each required RMA functional string are provided in spreadsheet and graphical formats in Appendix A. The data required to perform the availability analyses were obtained from both the ECS Reliability and Maintainability Predictions reports, documents 516-CD-002-002 and 518-CD-002-002, respectively.

This document reflects the February 1996 Technical Baseline maintained by the contractor configuration control board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B Reliability Predictions for the ECS Project [Document Number 516-CD-002]**

This Reliability Predictions Report, Contract Data Requirements List (CDRL) item 089, whose requirements are specified in Data Item Description (DID) 516/PA2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This Reliability Predictions report provides the ECS predicted hardware reliability data to support the availability modeling activity, which was documented in DID #515/PA2, Availability Models/Predictions and to support the maintainability predictions activity, which was documented in DID #518/PA3, Maintainability Predictions. The Reliability prediction is a continuous and iterative process throughout the program life cycle to ensure the ECS will achieve its functional availability requirements. This task is performed early in the design process or once hardware is identified to be an effective aid in evaluating the ECS design by providing information used as the basis for design decisions such as redundancy and fault management design approach. High failure rate items are also identified so special consideration can be given to areas that constitute potential risks to the system.

Results from this report will be used as inputs for determining life cycle costs, sparing requirements, maintenance planning and the development of the Maintainability Predictions and Availability Models reports.

This report incorporates the Government's comments received by the Data Management Office (DMO) on December 6, 1995 in the technical report No. 995-TR-951-175. This report also provides updates to the Release B Incremental Design Review (IDR) submittal, which was generated at the ECS Release B IDR time frame. The purpose of this submittal is to reflect the current ECS architecture and to present detailed predicted and operational MTBFs of the proposed ECS hardware Configuration Items (HWCIs) presented at the Release B Critical design Review (CDR) time frame. These HWCI's MTBFs are provided by the Commercial-Off-The-Shelf vendors and are thoroughly reviewed for accuracy by the ECS reliability and hardware procurement organizations. The applicable DAAC sites for the Release B SDPS and CSMS are: Goddard Space Flight Center (GSFC), Earth Resources Observation System (EROS) Data Center (EDC), Langley Research center (LaRC), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC), Oak Ridge National Laboratory (ORNL) and Alaska Synthetic Aperture Radar (SAR) Facility.

This report also presents the Parts Count reliability prediction methodology, ground rules and assumptions in accordance with MIL-Handbook-217F and Non Electronic Parts Reliability Data (NPRD-91), which are required when specific COTS vendor data or comparable vendor data are not available. The reliability software tool named Relex that supports the parts count prediction is also described in this report.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B Maintainability Predictions for the ECS Project [Document Number 518-CD-002]**

This Maintainability Predictions Report, Contract Data Requirements List (CDRL) item 091, whose requirements are specified in Data Item Description (DID) 518/PA3, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This Maintainability Predictions report provides the ECS predicted hardware Maintainability data to support the availability modeling activity, which was documented in DID #515/PA2, Availability Models/Predictions. The Maintainability prediction is a continuous and iterative process throughout the program life cycle to ensure the ECS will achieve its functional availability requirements. This task is performed early in the design process or once hardware is identified to be an effective aid in evaluating the ECS design by providing information used as the basis for design decisions such as redundancy, fault management design approach, accessibility to facilitate repair and hot switchable LRUs.

The maintainability prediction procedure highlights for the designer, those areas of poor maintainability, which justify product improvement, modification or a change in design. It also permits the user to make an early assessment of whether the predicted downtime, quality of personnel, tools and test equipment are adequate and consistent with the needs of system availability requirements.

Results from this report will be used as inputs for determining life cycle costs, sparing requirements, maintenance planning and the development of the availability models/predictions report.

This report incorporates the Government's comments received by the Data Management Office (DMO) on December 6, 1995 in the technical report No. 995-TR-951-175. This report also provides updates to the Release B Incremental Design Review (IDR) submittal, which was generated at the ECS Release B IDR time frame.

The purpose of this submittal is to reflect the current ECS architecture and to present detailed predicted and operational MTTRs (Mean Time To Repair) of the proposed ECS hardware Configuration Items (HWCIs) presented at the Release B Critical design Review (CDR) time frame. These HWCI's MTTRs are provided by the Commercial-Off-The-Shelf vendors and are reviewed for accuracy by the ECS reliability and hardware procurement organizations. The applicable DAAC sites for the Release B SDPS and CSMS are: Goddard Space Flight Center (GSFC), Earth Resources Observation System (EROS) Data Center (EDC), Langley Research center (LaRC), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC), Oak Ridge National Laboratory (ORNL) and Alaska Synthetic Aperture Radar (SAR) Facility.

This report also presents the maintainability prediction methodology, ground rules and assumptions in accordance with MIL-HDBK-472, Prediction Procedure II, which are required when specific COTS vendor data or comparable vendor data are not available.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B Hazard Analyses for the ECS Project [Document Number 513-CD-002]**

This document is submitted as required by CDRL item 086, DID 513/PA2, whose requirements are specified in this document as a deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The purpose of this document is to provide high level hazard analysis results of the ECS at the Release B IDR time frame, as described in the Data Item Description (DID) 513/PA2. This document also provides pointers to existing ECS hazard analysis related documents and plans that have documented current and future hazard protection and mitigation activities.

This document is revised from the previous Preliminary Design Review (PDR) final submittal, which was approved by the Government with comments on September 1, 1995. This submittal incorporates the responses from the Government's comments of the previous submittal and addresses the required aspects of hazard analysis in accordance with DID 513/PA2 for the ECS Release B configuration at the Incremental Design Review (IDR) time frame.

There are three aspects of hazard analysis considered in this document: ground system hazard analysis, spacecraft hazard analysis and loss of mission essential science data.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor configuration control board in accordance with the ECS Technical Direction Number 1, dated December 6, 1994.

- **Science Data Processing Segment (SDPS) Database Design and Database Schema Specifications for the ECS Project [Document Number 311-CD-002]**

The Database Design and Database Schema Specifications Document, Contract Data Requirement List (CDRL) item number 050, whose requirements are specified in Data Item description (DID) 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The purpose of this document is to illustrate, specify and communicate the design of ECS metadata and system persistent data providing information about ECS standard data products to software developers and the Government. It is a living document that captures ECS data requirements in a logically structured format that is useful to designers, developers and managers. This document is used to support configuration management of the stored data assets of the ECS during design and development phases of the system life cycle and subsequent production and maintenance activities. This is a practical means of assuring the consistency of data requirements across subsystems and releases and supporting the data standardization necessary for total system interoperability within heterogeneous open systems environment.

The scope of the products through this design and specifications document is identified in the Technical Baseline for the ECS Project, August 1995 and the Release Plan Content Description for the ECS Project, May 1995. The Technical Baseline is maintained by the contractor configuration control board in accordance with ECS Technical Baseline Direction Number 11, dated December 6, 1994. This document includes specifications for data that are the creation and deletion responsibility of one or more ECS Science Data Processing Segment (SDPS) Computer Software Configuration Items (CSCIs) that are stored and managed externally from the application processing software. The Directory, Directory Characteristics and Inventory Metadata; system persistent data; and related files organized within other controlled file system storage types (e.g., American Standard Code for Information Interchange [ASCII] or binary files, HyperText Markup Language [HTML] document files, hierarchical data format [HDF] files) are also specified in this document. Data requirements fully support the SDPS segment of Release A

and include partial support for future releases through provision for extensibility and incremental development.

- **Communications and System Management Segment (CSMS) Database Design and Database Schema Specifications for the ECS Project [Document Number 311-CD-003]**

This Communications and System Management Segment (CSMS) Database Design and Database Schema Specifications for the ECS Project, Contract Data Requirement List (CDRL) item number 050, with requirements specified in Data Item description (DID) 311/DV3, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The purpose of the CSMS Database Design Specification and Database Schema document is to support the CSMS segment of the ECS throughout its life cycle. It captures persistent system data requirements in a logically structured format that is useful to designers and developers. This document is also a useful tool to support configuration management of the stored system data of the ECS during design, development and subsequent maintenance activities.

This document reflects the Technical Baseline, 14 February 1996, maintained by the ECS Configuration Control Board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B Science Data Processing Segment (SDPS) Database Design and Database Schema Specifications for the ECS Project [Document Number 311-CD-008 (formerly 311-CD-002-005)]**

This document provides change pages for the Release B SDPS Database Design and Database Schema Specifications Document, Contract Data Requirement List (CDRL) item number 050, whose requirements are specified in Data Item description (DID) 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The purpose of this document is to provide change pages, which illustrate, specify and communicate the design of ECS earth science metadata and identify system persistent data to software developers and the government. It is a living document that captures ECS earth science data requirements in a logically structured format that is useful to designers, developers and managers. The earth science metadata model represented in this document is a practical means of assuring the consistency of data requirements across subsystems and releases and supporting the data standardization necessary for total system interoperability within a heterogeneous open systems environment.

The scope of the products supported through this design and specifications document is identified in the Technical Baseline for the ECS Project, February 1996 and the Release Plan Content Description for the ECS Project, October 1995. The Technical Baseline is maintained by the contractor configuration control board in accordance with ECS Technical Baseline Direction Number 11, dated December 6, 1994. This document includes specifications for data that are the creation and deletion responsibility of one or more ECS Science Data Processing Segment (SDPS) Computer Software Configuration Items (CSCIs) that are stored and managed externally

from the application processing software. The Directory, Directory Characteristics and Inventory Metadata; system persistent data; and specifications for related files, which may be organized within other controlled file system storage types (e.g., American Standard Code for Information Interchange [ASCII] or binary files, HyperText Markup Language [HTML] document files, or hierarchical data format [HDF] files) are also described in this document.

These change pages provide updated detailed design material for the Data Model, Data Server and Interoperability and Data Management Subsystems. In addition to the detail design sections for these two subsystems, other sections of the document have been updated as necessary to reflect design detail. A characterization of these changes is presented in Section 1.5.1.

- **Access Control List Database Design and Schema Specifications for the ECS Project [Document Number 311-CD-100]**

This Access Control List (ACL) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) item number 050, whose requirements are specified in Data Item Description (DID 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The purpose of the ACL Database Design and Database Schema Specification document is to support the maintenance of ACL data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The ACL Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 2 Drop 3 ACL software.

- **Data Distribution Server Database Design and Schema Specifications for the ECS Project [311-CD-101]**

This Data Distribution Server (DDIST) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) item number 050, whose requirements are specified in Data Item Description (DID 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The purpose of the DDIST Database Design and Database Schema Specification document is to support the maintenance of DDIST data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The DDIST Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 2 Drop 4PL DDIST software.

- **Data Management Subsystem Database Design and Database Schema Specifications [Document Number 311-CD-102]**

This Data Management (DM) Subsystem Database Design and Database Schema Specifications document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the DM Subsystem Database Design and Database Schema Specifications document is to support the administrators of the DM Subsystem database throughout its life cycle. Additionally, this document communicates the database specifications in sufficient detail to support other ongoing installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The DM Subsystem Database Design and Database Schema Specifications document describes the database that supports data requirements for the DM subsystem, Release 4 Drop 4PX.

- **Ingest Database Design and Database Schema Specification [Document Number 311-CD-103]**

The purpose of the INGEST Database Design and Database Schema Specification document is to describe the database design and schema specifications implemented to support the data requirements of Release 4 Drop 4PX INGEST CSCI.

- **Interoperability Subsystem (IOS) Database Design and Database Schema Specifications [Document Number 311-CD-104]**

This *Interoperability Subsystem (IOS) Database Design and Database Schema Specifications* document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the *IOS Database Design and Database Schema Specifications* document is to support the administrators of the IOS database throughout its life cycle. Additionally, this document communicates the database specifications in sufficient detail to support other on-going installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The *IOS Database Design and Database Schema Specifications* document describes the database that supports the data requirements for the IOS, Release 4 Drop 4PX.

- **Systems Management Subsystem (MSS) Database Design and Database Schema Specification [Document Number 311-CD-105]**

This System Management Subsystem (MSS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV1, is a required deliverable

under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the MSS Database Design and Database Schema Specification document is to support the maintenance of MSS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The MSS Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 4 Drop 4PX MSS software.

- **Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specification [Document Number 311-CD-106]**

This Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the PDPS Database Design and Database Schema Specification document is to support the maintenance of PDPS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The PDPS Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 4 Drop 4PX PDPS software.

- **Science Data Server Subsystem (SDPS) Database Design and Database Schema Specification [Document Number 311-CD-107]**

This Science Data Server Subsystem (SDPS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the SDSRV Database Design and Database Schema Specification document is to support the maintenance of SDSRV data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The SDSRV Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 4 Drop 4PX SDSRV software.

- **Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications [Document Number 311-CD-108]**

This *Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications* document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the *STMGT Subsystem Database Design and Database Schema Specifications* document is to support the administrators of the combined STMGT/DDIST Subsystem database throughout its life cycle. Also, this document communicates the database specifications in sufficient detail to support other ongoing installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The *STMGT Subsystem Database Design and Database Schema Specifications* document describes the database that supports data requirements for the STMGT and DDIST Subsystems, Release 4 Drop 4PX.

- **Subscription Server (SUBSRV) Database Design and Database Schema Specification [Document Number 311-CD-109]**

This Subscription Server (SUBSRV) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the SUBSRV Database Design and Database Schema Specification document is to support the maintenance of SUBSRV data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The SUBSRV Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 4 Drop 4PX SUBSRV software.

- **Data Management (DM) Subsystem Database Design and Database Schema Specifications [Document Number 311-CD-500]**

This Data Management (DM) Subsystem Database Design and Database Schema Specifications document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the DM Subsystem Database Design and Database Schema Specifications document is to support the administrators of the DM Subsystem database throughout its life cycle. Additionally, this document communicates the database specifications in sufficient detail

to support other ongoing installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The DM Subsystem Database Design and Database Schema Specifications document describes the database that supports data requirements for the DM subsystem, Release 5A.

- **Ingest Database Design and Database Schema Specification [Document Number 311-CD-501]**

The purpose of the INGEST Database Design and Database Schema Specification document is to describe the database design and schema specifications implemented to support the data requirements of Release 5A INGEST CSCI.

- **Interoperability Subsystem (IOS) Database Design and Database Schema Specifications [Document Number 311-CD-502]**

This *Interoperability Subsystem (IOS) Database Design and Database Schema Specifications* document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the *IOS Database Design and Database Schema Specifications* document is to support the administrators of the IOS database throughout its life cycle. Additionally, this document communicates the database specifications in sufficient detail to support other on-going installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The *IOS Database Design and Database Schema Specifications* document describes the database that supports the data requirements for the IOS, Release 5A.

- **Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specification [Document Number 311-CD-503]**

This Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the PDPS Database Design and Database Schema Specification document is to support the maintenance of PDPS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The PDPS Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5A PDPS software.

- **Science Data Server Subsystem (SDPS) Database Design and Database Schema Specification [Document Number 311-CD-504]**

This Science Data Server Subsystem (SDPS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the SDSRV Database Design and Database Schema Specification document is to support the maintenance of SDSRV data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The SDSRV Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5A SDSRV software.

- **Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications [Document Number 311-CD-505]**

This *Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications* document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the *STMGT Subsystem Database Design and Database Schema Specifications* document is to support the administrators of the combined STMGT/DDIST Subsystem database throughout its life cycle. Also, this document communicates the database specifications in sufficient detail to support other ongoing installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The *STMGT Subsystem Database Design and Database Schema Specifications* document describes the database that supports data requirements for the STMGT and DDIST Subsystems, Release 5A.

- **Subscription Server (SUBSRV) Database Design and Database Schema Specification [Document Number 311-CD-506]**

This Subscription Server (SUBSRV) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the SUBSRV Database Design and Database Schema Specification document is to support the maintenance of SUBSRV data and databases throughout the life cycle of ECS.

This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The SUBSRV Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5A SUBSRV software.

- **Systems Management Subsystem (MSS) Database Design and Database Schema Specification [Document Number 311-CD-507]**

This System Management Subsystem (MSS) Accountability Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the MSS Accountability Database Design and Database Schema Specification document is to support the maintenance of MSS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The MSS Accountability Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5A MSS software.

- **Release 5B.06 Data Management (DM) Subsystem Database Design and Database Schema Specifications [Document Number 311-CD-520]**

This Data Management (DM) Subsystem Database Design and Database Schema Specifications document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the DM Subsystem Database Design and Database Schema Specifications document is to support the administrators of the DM Subsystem database throughout its life cycle. Additionally, this document communicates the database specifications in sufficient detail to support other ongoing installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The DM Subsystem Database Design and Database Schema Specifications document describes the database that supports data requirements for the DM subsystem, Release 5B.06.

- **Release 5B.06 Ingest Database Design and Database Schema Specification [Document Number 311-CD-521]**

The purpose of the INGEST Database Design and Database Schema Specification document is to describe the database design and schema specifications implemented to support the data requirements of Release 5B.06 INGEST CSCI.

- **Release 5B.06 Interoperability Subsystem (IOS) Database Design and Database Schema Specifications [Document Number 311-CD-522]**

This *Interoperability Subsystem (IOS) Database Design and Database Schema Specifications* document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the *IOS Database Design and Database Schema Specifications* document is to support the administrators of the IOS database throughout its life cycle. Additionally, this document communicates the database specifications in sufficient detail to support other on-going installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The *IOS Database Design and Database Schema Specifications* document describes the database that supports the data requirements for the IOS, Release 5B.06.

- **Release 5B.06 Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specification [Document Number 311-CD-523]**

This Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the PDPS Database Design and Database Schema Specification document is to support the maintenance of PDPS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The PDPS Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5B.06 PDPS software.

- **Release 5B.06 Science Data Server Subsystem (SDPS) Database Design and Database Schema Specification [Document Number 311-CD-524]**

This Science Data Server Subsystem (SDPS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the SDSRV Database Design and Database Schema Specification document is to support the maintenance of SDSRV data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The SDSRV Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5B.06 SDSRV software.

- **Release 5B.06 Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications [Document Number 311-CD-525]**

This Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the *STMGT Subsystem Database Design and Database Schema Specifications* document is to support the administrators of the combined STMGT/DDIST Subsystem database throughout its life cycle. Also, this document communicates the database specifications in sufficient detail to support other ongoing installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The *STMGT Subsystem Database Design and Database Schema Specifications* document describes the database that supports data requirements for the STMGT and DDIST Subsystems, Release 5B.06.

- **Release 5B.06 Subscription Server (SUBSRV) Database Design and Database Schema Specification [Document Number 311-CD-526]**

This Subscription Server (SUBSRV) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the SUBSRV Database Design and Database Schema Specification document is to support the maintenance of SUBSRV data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The SUBSRV Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5B.06 SUBSRV software.

- **Release 5B.06 Systems Management Subsystem (MSS) Database Design and Database Schema Specification [Document Number 311-CD-527]**

This System Management Subsystem (MSS) Accountability Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the MSS Accountability Database Design and Database Schema Specification document is to support the maintenance of MSS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The MSS Accountability Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5B.06 MSS software.

- **Release 5B.06 Registry (REGIST) Database Design and Database Schema Specification [Document Number 311-CD-528]**

This Registry (REGIST) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description DID 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the REGIST Database Design and Database Schema Specification document is to support the maintenance of REGIST data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The REGIST Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 5B.06 REGIST software.

- **Release 6A.03 Data Management (DM) Subsystem Database Design and Database Schema Specifications [Document Number 311-CD-600]**

This Data Management (DM) Subsystem Database Design and Database Schema Specifications document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the DM Subsystem Database Design and Database Schema Specifications document is to support the administrators of the DM Subsystem database throughout its life cycle. Additionally, this document communicates the database specifications in sufficient detail to support other ongoing installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The DM Subsystem Database Design and Database Schema Specifications document describes the database that supports data requirements for the DM subsystem, Release 6A.03.

- **Release 6A.03 Ingest Database Design and Database Schema Specification [Document Number 311-CD-601]**

The purpose of the INGEST Database Design and Database Schema Specification document is to describe the database design and schema specifications implemented to support the data requirements of Release 6A.03 INGEST CSCI.

- **Release 6A.03 Interoperability Subsystem (IOS) Database Design and Database Schema Specifications [Document Number 311-CD-602]**

This *Interoperability Subsystem (IOS) Database Design and Database Schema Specifications* document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the *IOS Database Design and Database Schema Specifications* document is to support the administrators of the IOS database throughout its life cycle. Additionally, this document communicates the database specifications in sufficient detail to support other on-going installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The *IOS Database Design and Database Schema Specifications* document describes the database that supports the data requirements for the IOS, Release 6A.03.

- **Release 6A.03 Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specification [Document Number 311-CD-603]**

This Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the PDPS Database Design and Database Schema Specification document is to support the maintenance of PDPS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The PDPS Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 6A.03 PDPS software.

- **Release 6A.03 Science Data Server Subsystem (SDPS) Database Design and Database Schema Specification [Document Number 311-CD-604]**

This Science Data Server Subsystem (SDPS) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable

under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the SDSRV Database Design and Database Schema Specification document is to support the maintenance of SDSRV data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The SDSRV Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 6A.03 SDSRV software.

- **Release 6A.03 Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications [Document Number 311-CD-605]**

This *Storage Management (STMGT) Subsystem Database Design and Database Schema Specifications* document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the *STMGT Subsystem Database Design and Database Schema Specifications* document is to support the administrators of the combined STMGT/DDIST Subsystem database throughout its life cycle. Also, this document communicates the database specifications in sufficient detail to support other ongoing installation and operational activities (e.g., configuration management, data administration, system installation and maintenance).

The *STMGT Subsystem Database Design and Database Schema Specifications* document describes the database that supports data requirements for the STMGT and DDIST Subsystems, Release 6A.03.

- **Release 6A.03 Subscription Server (SUBSRV) Database Design and Database Schema Specification [Document Number 311-CD-606]**

This Subscription Server (SUBSRV) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the SUBSRV Database Design and Database Schema Specification document is to support the maintenance of SUBSRV data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The SUBSRV Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 6A.03 SUBSRV software.

- **Release 6A.03 Systems Management Subsystem (MSS) Database Design and Database Schema Specification [Document Number 311-CD-607]**

This System Management Subsystem (MSS) Accountability Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the MSS Accountability Database Design and Database Schema Specification document is to support the maintenance of MSS data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The MSS Accountability Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 6A.03 MSS software.

- **Release 6A.03 Registry Database Design and Database Schema Specification [Document Number 311-CD-608]**

This Registry (REGIST) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the REGIST Database Design and Database Schema Specification document is to support the maintenance of REGIST data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The REGIST Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 6A.03 REGIST software.

- **Release 6A.05 NameServer (NM) Database Design and Database Schema Specification [Document Number 311-CD-609]**

This NameServer (NM) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item Description (DID) 311/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

The purpose of the NM Database Design and Database Schema Specification document is to support the maintenance of NM data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

The NM Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 6A.05 MSS software.

- **Release 4PX and 4PY Implementation Earth Science Data Model [Document Number 420-TP-015]**

The purpose of this technical document is to provide modifications to the Release 4 Earth Science Data Model for the ECS Project, which illustrate, specify and communicate the design of the ECS earth science metadata. This technical paper represents the Release 4 Implementation design of the ECS earth science data model, useful to designers, developers, scientists and managers. The earth science metadata model represented in this document is a practical means of assuring the consistency of data requirements across subsystems, and supporting the data standardization necessary for total system interoperability within a heterogeneous open system environment.

- **Release 5A Implementation Earth Science Data Model [Document Number 420-TP-020]**

The purpose of this technical document is to provide modifications to the Release 5A Earth Science Data Model for the ECS Project, which illustrate, specify and communicate the design of the ECS earth science metadata. This technical paper represents the Release 5A Implementation design of the ECS earth science data model, useful to designers, developers, scientists and managers. The earth science metadata model represented in this document is a practical means of assuring the consistency of data requirements across subsystems, and supporting the data standardization necessary for total system interoperability within a heterogeneous open system environment.

- **Release 5B Implementation Earth Science Data Model [Document Number 420-TP-021]**

The purpose of this technical document is to provide modifications to the Release 5B Earth Science Data Model for the ECS Project, which illustrate, specify and communicate the design of the ECS earth science metadata. This technical paper represents the Release 5B Implementation design of the ECS earth science data model, useful to designers, developers, scientists and managers. The earth science metadata model represented in this document is a practical means of assuring the consistency of data requirements across subsystems, and supporting the data standardization necessary for total system interoperability within a heterogeneous open system environment.

- **Release 6A Implementation Earth Science Data Model for the ECS Project [Document Number 420-TP-022]**

The purpose of this technical document is to provide modifications to the Release 6A Earth Science Data Model for the ECS Project, which illustrate, specify and communicate the design of the ECS earth science metadata. This technical paper represents the Release 6A Implementation design of the ECS earth science data model, useful to designers, developers, scientists and managers. The earth science metadata model represented in this document is a practical means of assuring the consistency of data requirements across subsystems, and

supporting the data standardization necessary for total system interoperability within a heterogeneous open system environment.

## 4.4 Commercial Off The Shelf (COTS) Products

The COTS Analysis and Modeling documents are project sensitive material and were provided to ESDIS on a semi-annual basis starting in April 1995. As of late 2001, this document is no longer submitted in hard copy form but by disk to ESDIS. There are no copies available on the web site. To see these documents please contact the Data Management Office of the ECS Project. The address for the DMO is listed in the Preface of this document.

The 335 documents can be found at the http://edhs1.gsfc.nasa.gov/waisdata/catalog/opscat.html web site.

- **COTS Analysis and Modeling Report for the ECS Project [Document Number 222-CD-001]**

This Commercial Off-The-Shelf (COTS) Analysis and Modeling Report, Contract Data Requirement List (CDRL) Item Number 144, whose requirements are specified in Data Item Description (DID) 222/SE2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) Contract (NAS5-60000). This edition of DID 222 is based upon a negotiated agreement between Raytheon and NASA specific to the Estimate at Completion (EAC) Restructure of the ECS contract.

The purpose of this document is to present the results of ongoing analysis and modeling of the total COTS hardware, software, and maintenance requirements; and if required, to provide recommended changes to strategic solutions to existing capacity requirements contained in the Functional and Performance Requirements Specification (F&PRS) for the ECS. A major objective of the analysis and modeling activity is to provide data for managing the COTS cost within its projected budget.

This document reflects work performed in accordance with paragraph 2.3.3 of the EOSDIS Core System Statement of Work (SOW). This report is provided semi-annually, and presents the results of ongoing analysis and modeling of the total COTS hardware, software and maintenance requirements.

- **ECS COTS Deployment Plan [Document Number 335-CD-001]**

This document is the ECS COTS Deployment Plan for COTS products being upgraded for the period defined for Volume 1 of this document (April -- October 1999), for the ECS Project which is defined by Data Item description (DID) 335/DV2.

The purpose of this plan is to provide the approach for the upgrading of the COTS products identified for Volume 1. This plan describes the process for developing, integrating, testing, and shipping all Volume 1 products including reviewing, monitoring, and providing status.

- The "ECS COTS Deployment Plan, Volume 1" documents the ECS approach to upgrading the various COTS packages described in Section 3.2. This includes upgrades that occur during the period April 1, 1999 through October 15, 1999. This document will

be updated with subsequent volumes that will provide coverage on COTS upgrades in subsequent volumes. Each volume will cover a six to nine month period of time. Volume 2 will cover COTS upgrades from the period November 1999 through June 2000.

- **ECS COTS Deployment Plan [Document Number 335-CD-002]**

This document is the ECS COTS Deployment Plan for COTS products being upgraded for the period defined for Volume 2 of this document (November 1999 -- July 2000), for the ECS Project which is defined by Data Item description (DID) 335/DV2.

The purpose of this plan is to provide the approach for the upgrading of the COTS products identified for Volume 2. This plan describes the process for developing, integrating, testing, and shipping all Volume 2 products including reviewing, monitoring, and providing status.

The "ECS COTS Deployment Plan, Volume 2" documents the ECS approach upgrading the various COTS packages described in Section 3.2. This includes upgrades that occur during the period December 1, 1999 through July 31, 2000. This is volume 2 of this document. This document will be updated with subsequent volumes that will provide coverage on COTS upgrades in incremental volumes specifying upgrades over a six to nine month period of time. Volume 1 covered the period from April to October 1999. The next volume will be volume 3 and its coverage will begin in August 2000.

- **ECS COTS Deployment Plan [Document Number 335-CD-003]**

This document is the ECS COTS Deployment Plan for COTS products being upgraded for the period defined for Volume 3 of this document (August 2000 -- February 2001), for the ECS Project which is defined by Data Item description (DID) 335/DV2.

The purpose of this plan is to provide the approach for the upgrading of the COTS products identified for Volume 3. This plan describes the process for developing, integrating, testing, and shipping all Volume 3 products including reviewing, monitoring, and providing status.

The "ECS COTS Deployment Plan, Volume 3" documents the ECS approach upgrading the various COTS packages described in Section 3.2. This includes upgrades that occur during the period August 1, 2000 through February 28, 2001. This is volume 3 of this document. This document will be updated with subsequent volumes that will provide coverage on COTS upgrades in incremental volumes specifying upgrades over a six to nine month period of time. The next volume will be volume 4 and its coverage will begin in March 2001.

- **ECS COTS Deployment Plan [Document Number 335-CD-004]**

This document is the ECS COTS Deployment Plan for COTS products being upgraded for the period defined for Volume 4 of this document for the ECS Project which is defined by Data Item description (DID) 335/DV2.

The purpose of this plan is to provide the approach and currently available details related to the upgrading of the COTS products identified for Volume 4. This plan describes the process for identifying, developing, integrating, testing, and shipping all Volume 4 products including reviewing, monitoring, and providing status.

The "ECS COTS Deployment Plan, Volume 4" documents the ECS approach and currently identified plans for upgrading the various COTS packages described in section 4 and section 5 of this document. Volume 4 includes upgrades that occur during the period January 1, 2001 through June 30, 2001. This document will be updated with subsequent volumes that will provide coverage on COTS upgrades in incremental volumes specifying upgrades over a six to nine month time period. The next volume will be volume 5 and its coverage will begin in July 2001.

- **ECS COTS Deployment Plan [Document Number 335-CD-005]**

This document is the ECS COTS Deployment Plan for COTS products being upgraded for the period defined for Volume 5 of this document for the ECS Project which is defined by Data Item description (DID) 335/DV2.

The purpose of this plan is to provide the approach and currently available details related to the upgrading of the COTS products identified for Volume 5. This plan describes the process for identifying, developing, integrating, testing, and shipping all Volume 5 products including reviewing, monitoring, and providing status.

- The "ECS COTS Deployment Plan, Volume 5" documents the ECS approach and currently identified plans for upgrading the various COTS packages described in section 4 and section 5 of this document. Volume 5 includes upgrades that occur during the period July 1, 2001 through December 31, 2001. This document will be updated with subsequent volumes that will provide coverage on COTS upgrades in incremental volumes specifying upgrades over a six to nine month time period. The next volume will be volume 6 and its coverage will begin in December 2001.

- **ECS COTS Deployment Plan [Document Number 335-CD-006]**

This document is the ECS COTS Deployment Plan for COTS products being upgraded for the period defined for Volume 6 of this document for the ECS Project as defined by Data Item description (DID) 335/DV2.

The purpose of this plan is to provide the approach and available details related to the upgrading of the COTS products identified for Volume 6. This plan describes the process for identifying, developing, integrating, testing, and shipping all Volume 6 products; including but not limited to reviewing, monitoring, and providing a status of those products.

The "ECS COTS Deployment Plan, Volume 6" documents the ECS approach and currently identified plans for upgrading the various COTS packages described in section 4 and section 5 of this document. Volume 6 includes upgrades that occur during the period January 2002 through June 30, 2002. This document will be updated with subsequent volumes that will provide coverage on COTS upgrades in incremental volumes specifying upgrades over a six to nine month time period. The next volume will be volume 7 and its coverage will begin in July 2002.

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# 5. ECS Project Management, Operations and Training

This section provides the ECS project management, operations and training aspects of the project. These project aspects include:

- system process management (via the Integrated Support Plan, Project Management, Configuration Management, Data Management, Quality Assurance Plans, Performance Assurance Plan, Verification Plan, Acceptance Testing Management Plan and Property Management Plan),
- system transitions at the sites (via system transition plans and COTS Pre-Ship Reviews),
- system operations support (via operations tools manuals, operations procedures and operations equipment monitoring), and
- system training (via project developed training materials)

Figure 5-1 is the system process management, operations support and training diagram. The diagram shows the plans and documents used to define and support the key work processes used on the ECS project, to support the site and development facility operations and to provide training for project, DAAC and government personnel.

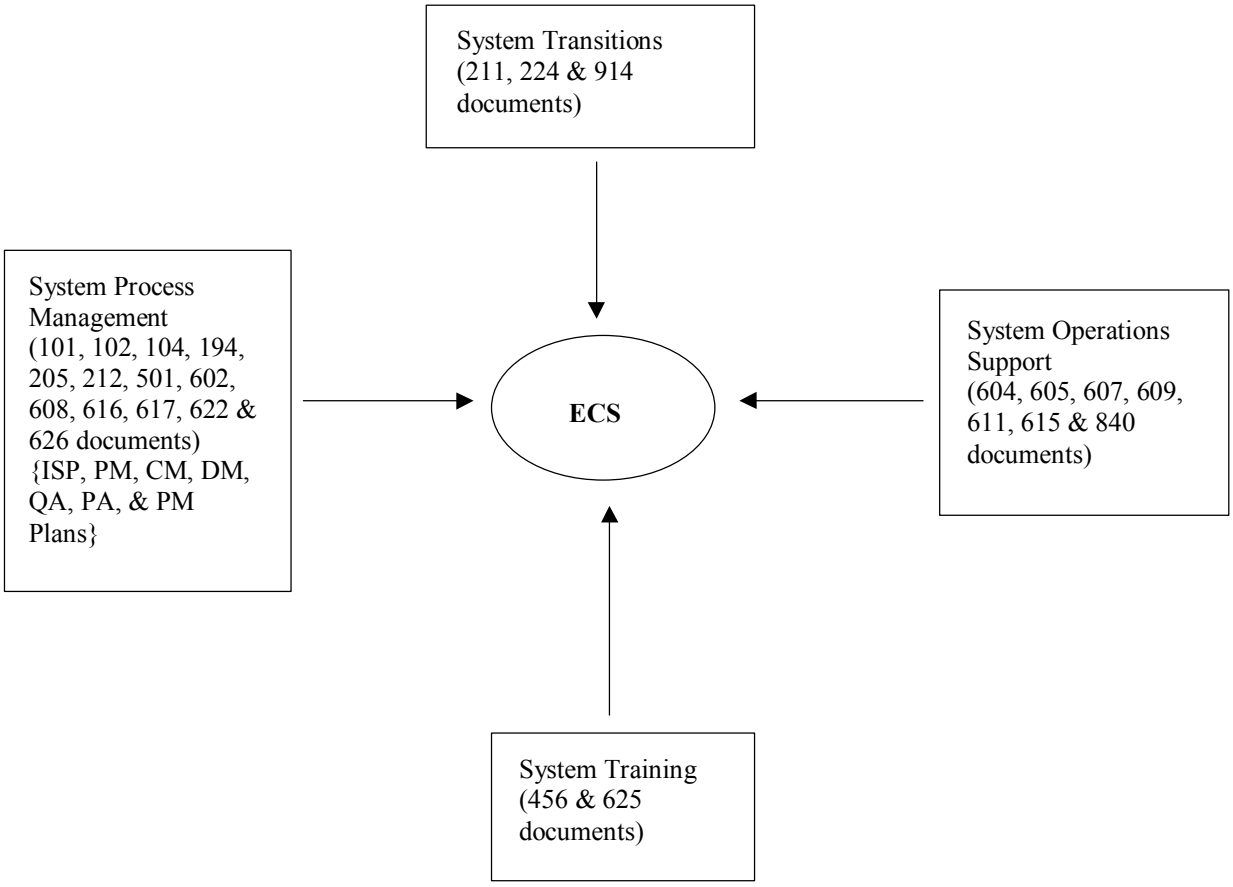


***Figure 5-1. System Process Management: Operations Support and Training***

## 5.1 System Process Management

The following documents provide the guidelines to management of the key work processes for the ECS project. The Project Management Office, Systems Engineering Office, Systems Integration and Test Office, Science Office, Maintenance and Operations Office, Configuration Management Office, Data Management Office and the Quality Assurance Office generated the plans. These plans can be found at the http://edhs1.gsfc.nasa.gov/waisdata/catalog/pmcat.html web site.

- **Systems Engineering Plan [Document Number 194-201-SE1-001]**

This Systems Engineering Plan (SEP), Contract Data Requirement List (CDRL) item 021, whose requirements are specified in Data Item Description (DID) 201/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The ECS SEP addresses systems engineering functions, products, interfaces, methods, organization, responsibilities, tools, along with other activities relevant to accomplishing the ECS Statement of Work. This plan describes systems engineering's approach to performing the overall system design, to facilitating flow down of system requirements to progressively lower levels, and integrating lower-level designs to ensure integrity. It discusses the use of trade studies, models and prototypes that the team will execute in the performance of systems engineering tasks. The ECS SEP identifies and discusses organizational and technical interfaces and interaction between the design, implementation, integration, testing, deployment, maintenance, and operations of the system.

The ECS SEP defines the technical responsibilities assigned to the systems engineering function to which a number of ECS contractor organizations contribute. Several offices within the ECS organization perform ECS system engineering. The ECS SEP describes the systems engineering leadership role of the System Integration and Planning (SI&P) Office. Each segment development organization has system engineering responsibilities for the segment. This document illustrates how SI&P conducts its own activities and how SI&P interacts with other project organizations to retain a complete oversight of the development activity as well as provide design consistency throughout the project.

ECS will be developed utilizing an evolutionary development process. For ECS, the systems engineering discipline permeates all the project's evolutionary life cycle phases, thus the scope of the systems engineering function is expanded significantly with respect to development conducted under more traditional single delivery life cycles. The ECS SEP identifies activities and methods for the completion of all systems engineering activities.

- **Verification Plan for the ECS Project [Document Number 194-401-VE1-002]**

The Verification Plan, Contract Data Requirements List (CDRL) item 063, whose requirements are specified in Data Item Description (DID) 401/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This Verification Plan describes the test, review and analysis effort to be conducted for the ECS. This document presents the overall processes and activities associated with verifying the ECS during all life cycle phases and at all level of verification. It delineates the roles and responsibilities of each verification organization associated with the ECS project.

This document defines the overall plan for the verification of the ECS, its segments and their main components. It applies to all levels of verification throughout the ECS life cycle. Verification activities for the ECS development and operational stages are included, although the emphasis is on the development stage. The roles and activities of all ECS contractor verification organizations, as well as the Government, the EOSDIS Independent Verification and Validation (IV&V) contractor, and the science community as described herein are for informational purposes only. This document positively does *not* impose any obligations or restrictions whatsoever on the Government, the IV&V contractor and the science community.

- **Acceptance Testing Management Plan for the ECS Project [Document Number 194-415-VE1-002]**

The Acceptance Testing Management Plan, Contract Data Requirements List (CDRL) item 074, whose requirements are specified in Data Item Description (DID) 415/VE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this document is to define how the independent acceptance test program is organized, managed and implemented. Its objective is to provide the basis for an effective and efficient overall testing plan for the Independent Acceptance Test Organization (IATO) with clearly defined roles and responsibilities and clear and unambiguous interfaces to all external contractor organizations (i.e., investigators, spacecraft vendor, etc.), the Government and the Independent Verification and Validation (IV&V) contractor.

This document defines the management plan for the Hughes Applied Information System (HAIS) ECS Acceptance Test Program. The major element of this program is carried out by the IATO, which is part of the System Integration and Planning Office (SI&P) of the ECS project. This plan describes the IATO charter and organization. It defines the responsibilities, processes and procedures used by the organization and its interfaces with other offices within the ECS project. This document outlines the methods the development organizations will use to deliver initial releases and release upgrades to the IATO. It also describes the methods for preparing and conducting acceptance tests. Nonconformance reporting and resolution is described insofar as it relates to the IATO. The methods used for submitting releases that have passed acceptance testing to configuration management are defined. The Maintenance and Operations Management Plan (DID 601/OP1) addresses IATO's involvement in emergency updates. The processes described in this plan apply to all aspects of the ECS system.

- **Software User's Guide and Operations Procedure Handbook for the ECS Project, Volume 4: Software Developer's Guide to Preparation, Delivery, Integration and Test with ECS [Document Number 205-CD-002]**

The successful integration of science algorithms into the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS) is a critical activity in the EOSDIS Project. This document contains information necessary for developers of Science Data Production Software (SDPS/W) to successfully integrate their software into the ECS. This document is submitted as required by Contract Data Requirements List item 025, Data Item Description 205/SE1 of the ECS Contract (NAS5-60000).

It is the goal of EOSDIS to provide end-to-end services from EOS instrument data collection to science data processing to full access to EOS and other Earth science data holdings.

This document is intended as a guide to the developers of SDPS/W to be run using the operational ECS Processing Services of a Distributed Active Archive Center (DAAC). A broad overview of the ECS Planning and Data Processing Subsystems is provided, along with a discussion of several issues concerning the design, development and delivery of SDPS/W to the

DAAC. References to the essential and background documentation, including resources on the World Wide Web (WWW) are provided along with directions on how to obtain these materials.

This guide is the fourth volume of the *Science User's Guide and Operations Procedure Handbook for the ECS Project*. Volumes 1-3 describe the ECS Client and how to access the ECS data services.

- **Science User's Guide and Operations Procedures Handbook (Release B.0) for the ECS Project [Document Number 205-CD-004]**

This document responds to DID 205, providing a user's guide for client software.

This guide is intended to provide a description of the delivered tools at a level of detail suitable for science users.

This guide describes the tools delivered with Release B.0, Version 1. They are EOSView, the B0 Search and Order Tool (B0SOT), the Earth Science On-line Directory (ESOD), the Data Acquisition Request (DAR) tool and the Desktop.

- **Game Plan for the ECS Project [Document Number 212-WP-002]**

The ECS Project Game Plan describes the approach to provide NASA and ECS with the necessary capability to satisfy the NASA mission. For each release, this plan identifies the development and deployment strategy, all items to be delivered by the responsible organizations, and key milestones. It also discusses mechanisms to be used to monitor progress. This document is applicable to contractor and government personnel working on and supporting the ECS program as it provides a single source of information concerning the key release activities. This document is expected to be evolutionary in nature and therefore is to be refined and extended as events dictate.

- **Release B Integrated Support Plan for the ECS Project [Document Number 616-CD-002]**

This document, Contract Data Requirements List (CDRL) item 122, whose requirements are specified in Data Item Description (DID) 616/OP2, is a required deliverable under the Earth Observing Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This Integrated Support Plan (ISP) covers the ILS Planning and management functions to be performed to support Release B. This plan is provided in accordance with CDRL 122 and in compliance of the ECS Statement of Work.

Release B provides archive and distribution service for the Landsat-7 and COLOR missions, and it provides product generation support for COLOR.

The purpose of this plan is to identify the processes for providing logistics support to Release B of the ECS project in a manner that accomplishes ECS objectives. This plan establishes the contractor's plan for managing the ECS ILS efforts. It provides the direction and guidance necessary to control the logistics efforts from initial design through system installation, operations and upgrades. This document is applicable to the ECS Release B Project Team, vendors, and third party contractors in providing logistics support to the ECS Project.

This plan addresses the management and implementation of the ILS program. The ILS program includes management of components and systems identified as part of Release B, including Government Furnished Equipment/Government Furnished Property (GFE/GFP) and consumables. The objective of ILS functions is to achieve the ECS functional operational availability ($A_0$) requirements at the least life cycle cost. ILS functions are iterative and continuous from the early requirement analysis, system design and implementation and during system operations. The operational ILS thrust is to achieve and sustain the required operational availability ($A_0$) and mean down time (MDT) objectives.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **Release B Logistics Support Analysis Plan for the ECS Project [Document Number 617-CD-002]**

This Logistics Support Analysis (LSA) Plan, Contract Data Requirement List (CDRL) item 123, whose requirements are specified in Data Item Description (DID) 617/OP3, is a required deliverable under the Earth Observing Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This plan describes the implementation of the LSA requirements of the ECS Statement of Work (SOW) and NASA's ECS integrated Logistics Support (ILS) Plan. Its purpose is to describe the approach that will be taken by the ECS contractor for conducting logistics support analysis activities necessary to accomplish the following:

a. Cause supportability requirements to be integral part of the ECS requirements and design

b. Define support requirements that are optimally related to the design and to each other

c. Define the support required during the operational phase

d. Prepare related logistics data products

This document describes the ECS contractor team's LSA approach to identifying ECS logistics requirements and to planning system logistics support. This plan is a tailored application of Task 102, MIL-STD-1388-1A and is provided in accordance with CDRL 123 and the ECS SOW. It identifies the requirements and processes for conducting logistics support analyses. This plan, the ECS ILS plan, the Integrated Support Plan and MIL-STD-1388-1A are the guidance documents for the conduct of LSA tasks.

This plan addresses the management and implementation of the LSA program throughout the ECS design and operations phases of Release B. LSA activities will be restricted to analyses of support considerations that have impact upon the ECS cost, performance and operations. The LSA program is structured to support accomplishment of ECS Release B performance and support objectives at the least life cycle cost (LCC) throughout the ECS Project. This plan addresses the degree and timing of LSA activities and resources to ensure supportability issues are considered in the design. It also addresses the continuing analysis of support performance

during ECS operations to modify the logistics support where necessary to improve performance or to reduce costs.

- **Training Plan for the ECS Project [Document Number 622-CD-001]**

This ECS Training Plan, Contract Data Requirement List (CDRL) item 128, whose requirements are specified in Data Item Description (DID) 622/OP2, is a required deliverable under the Earth Observing Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This plan describes the responsibilities and processes for preparing and executing ECS staff training to maintain and operate the ECS Release B.0 system and to satisfactorily accomplish the following missions:

- AM-1 SSI&T
- Landsat-7 SSI&T
- Meteor 3M-1(SAGE III SSI&T)
- Science data processing

In addition, the training plan provides direction on gathering training requirements, assessing the needs of the training population, determining training sources, developing training course material, delivering and evaluating the training program and certifying designated personnel

This plan defines training requirements as they relate to the operations and maintenance of Release B.0. The scope of this plan includes direction on general processes and policies of the Release B.0 training program and is limited to the Release B.0 software and hardware design. Training on management and personal development is not included in this document.

All members of the ECS Contractor Team use this document.

This document reflects the February 1997 Technical Baseline maintained by the contractor Configuration Control Board in accordance with CDRL 224-CD-001-001, dated February 28, 1997.

- **M&O Certification Plan for the ECS Project [Document Number 626-CD-100]**

This M&O Certification Plan, Contract Data Requirement List (CDRL) item 130, whose requirements are specified in Data Item Description (DID) 626/OP1, is a required deliverable under the Earth Observing Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This plan describes the responsibilities and recommended processes for certifying M&O staff to maintain and operate the Version 2.0 ECS system and to satisfactorily accomplish the following:

- Identify positions that require certification
- Identify the minimum formal and informal training required for each position

- Describe the roles and responsibilities for administering and approving certification including record keeping
- Identify positional skill catalogs

This plan defines the recommended certification requirements for Ecs as it relates to the operations and maintenance of ECS. The scope of this plan addresses the process and responsibilities for certifying selected staff in order to be qualified to operate and maintain the Version 2,0 ECS system. The certification process included in this plan identifies the operator and maintenance positions requiring certification and defines the appropriate criteria for certification. Roles and responsibilities for administering and approving certification are also addressed in this plan.

All members of the ECS Contractor Team use this document.

- **Project Management Plan [Document Number 101-CD-001]**

This revision to the Project Management Plan describes the management approach, processes and mechanisms that the ECS Contractor employs to execute the ECS Statement of Work and other contractual specifications. The plan serves two purposes: 1) to internally guide the operations of the Contractor's project organization; and 2) when approved, to specify the framework for coordination between the Government and Contractor. The pervasive themes that dominate the project management approach are: 1) concrete planning for involvement of science users with measurement feedback on performance and satisfaction; and 2) achieving technical performance within cost and schedule constraints.

- **Configuration Management Plan [Document Number 102-CD-003]**

This document is the Configuration Management Plan for the ECS Project. It is submitted as required by the Contract Data Requirements List (CDRL), Item 002, DID 102/MG1, for the EOSDIS Core System (ECS) contract. This document integrates the ECS Development phase plan with that for ECS Maintenance and Operations into one plan, that is applicable throughout the system life cycle for managing ECS configurations.

The purpose of this plan is to describe the process by which ECS shall manage SDPS configurations throughout the life cycle of the project. The document describes the existing and planned processes for managing and providing status of the ECS science system. This plan, and subordinate project instructions and work instructions, implement the tasks contained in the ECS contract Statement of Work (SOW) and the configuration management requirements set forth in the ESDIS CM procedures.

This document is an update to the Science Data Processing Segment Maintenance and Operations Configuration Management as provided in 102-CD-002-003 for the ECS Project, January 2001.

Provisions of this plan apply to all documentation, software, hardware and data, which will be supplied by Raytheon Systems Company (RSC) under the ECS contract.

This plan:

- Implements requirements from Mod 86, ECS Restructure Proposal for Contract NAS5-60000 (803-RD-025-001), ESDIS Project Configuration Management Procedures (423-10-21), hereinafter referred to as the ESDIS Plan, and Science Systems Program Control Management Board (SS PCMB Configuration Management Plan (423-10-21-1).

- Establishes all configuration management (CM) policies and methodologies relating to the ECS. It describes the ECS organization(s) responsible for planning and implementing the ECS CM process and the relationships between the ESDIS Configuration Control Board (CCB) and the contractor's development Change Control Boards (CCB). [NASA's convention is Configuration Control Board. ECS Project convention is Change Control Board.] In addition, this plan defines the processes by which ECS configuration control, configuration verification (to include configuration identification, status accounting and auditing), custom software CM will be accomplished

This document describes configuration management processes at a summary level and references appropriate project instructions (PI) and Work Instructions (WI) that are regularly maintained to ensure continuous process improvement. This document reflects the changes to improve its level of support to the ECS program within the Configuration Management Office. This plan is binding on all ECS Project subcontractors.

- **Data Management Plan [Document Number 104-CD-001]**

This document is submitted as required by Data Item Description (DID) 104/MG1 for the ECS Data Management Plan on the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) contract. This document was previously submitted as identified in the Document History, page ix of this submittal.

The purpose of the ECS Data Management Plan (EDMP) is to establish the methodology for administering the project requirements for data management, and for providing efficient and cost-effective storage, maintenance, control and dissemination of these data. The documents and data managed by this function consist of Contract Data Requirements List (CDRL). Other documents required by contract review include presentation materials, technical papers and white papers, and pertinent data such as contract correspondence, progress reports and background information. Specific procedures relating to DM activities are covered in the Data Management Procedures on the ECS internal document server at the http://dmserver.gsfc.nasa.gov/proj_instr/pi_index.html web site.

This plan defines and describes the organization, work activities and methods used to ensure effective management of data and documentation related to the design, development, integration, test and operation of the EOSDIS Core System. The data management (DM) requirements in this plan are applicable to ECS data and documentation being supplied by the ECS prime contractor, Raytheon Information Technology Systems, under the ECS contract. The requirements of this plan are also binding on the prime's subcontractors.

- **Quality Assurance Plan [Document Number 501-PR-001]**

This document describes the EOSDIS Core System (ECS) Science and Data Processing Segment (SDPS) Quality Assurance (QA) activities. This plan does not require review and approval by the customer. The plan will be used by the ECS SDPS QA organization and other functional departments within the ECS SDPS program as a reference to the QA activities to be performed on the program. The purpose of this revision is to update the activities of the ECS SDPS Quality Assurance organization around the current activities of the ECS SDPS Program.

The scope of this document covers the QA activities for the ECS SDPS program. It is important to note that the quality assurance activities described are performed on the ECS SDPS organization activities. It does not address activities for the other segments of the ECS program.

This document will outline the activities of the ECS SDPS Quality Assurance staff at a summary level. The QA staff activities are directed by project instructions to conduct consistent and objective quality assurance actions. All project instructions are maintained on a local server and are accessible by each member of the Quality Assurance staff.

- **Performance Assurance Implementation Plan [Document Number 501-CD-001]**

This Performance Assurance Implementation Plan (PAIP), Contract Data Requirements List (CDRL) item 076, whose requirements are specified in Data Item Description (DID) 501/PA1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

This document describes the management approach, processes, and mechanisms that the ECS Contractor employs to execute the ECS Statement of Work (SOW) and other contractual specifications. The plan serves two purposes: 1) to internally guide the operations of the Contractor's project organizations; and 2) when approved, to specify the framework for coordination between the Government, Contractor and Subcontractors. The themes that dominate the Performance Assurance management approach are as follows: 1) Concrete planning for the involvement of the various release, segments and subcontractors with measurement feedback on performance and satisfaction; and 2) Achieving technical performance within cost and schedule constraints

The ECS PAIP outlines the steps by which the Performance Assurance Requirements will be managed and implemented, and defines the roles and responsibilities for ECS project organizations assigned to Performance Assurance. The PAIP addresses software and hardware quality assurance, reliability, maintainability, analysis, and Verification and Validation (V&V) functions. The plan describes the ECS project's approach, from performance of in-process inspection activities to participation on the Configuration Control Board (CCB), and process flow of quality requirements to the ECS Contractor Team and vendors. This document is to be used by all ECS Contract Team Members including subcontractors.

- **Property Management Plan for the ECS Project [Document Number 602-CD-001]**

This plan is prepared in compliance with Contract Data Requirements List (CDRL) item 110 as required by the Earth Observing System Data and Information System (EOSDIS) Core System (ECS Contract NAS5-60000).

The purpose of this document is to identify responsibilities and procedures for the management and execution of ECS property management functions. This document has been revised to reflect the actual processes that are in practice and that are different from when the original document was produced. When approved by the Government, this document will establish the processes, policies and procedures to be followed by the ECS contractor in managing, accounting for, and reporting contractor-acquired COTS hardware, software and Government Furnished Property (GFP).

The objectives of property management are to accomplish the following:

- Maintain control of ECS property from time of receipt until relief from accountability through approved means
- Maintain accountability of ECS property through the establishment and maintenance of accountable records that provide accurate description, location and condition status of the property

This plan addresses management of ECS Contractor-acquired commercial-off-the-shelf (COTS) hardware and software and GFP until it is accepted by the Contracting Officer (CO) or the Contracting Officer's Technical Representative (COTR). This also includes management of contractor-acquired property and GFP in which the ECS contractor has direct management and operations (M&O) responsibility.

- **ECS Science Operations Plan [Document Number 608-CD-001]**

The Earth Observing System (EOS) Data and Information System (EOSDIS), as the National Aeronautics and Space Administration's (NASA) overall Earth Science discipline data system, provides the ground system for the collection and analysis of science data to support scientists in resolving the dynamics of the Earth's components and the processes by which they interact. As a part of the EOS program, EOSDIS supports: the planning, scheduling and control of the EOS series of spacecraft; exchanging commands data and algorithms with the European Space Agency (ESA), Japan, Canada, the National Oceanic and Atmospheric Administration (NOAA) and any other non-NASA entities involved in the overall EOS mission; the coordination of these activities with other data gathering systems; and the transformation of the observations into physical variables, providing for higher levels of processing and presenting the data to users in forms that facilitate and stimulate interactive scientific research. The portion of EOSDIS addressed in this document is the science system portion of the EOSDIS Core System (ECS).

The ECS provides the ground facilities and procedures to support and operate the EOS Terra and Aqua missions. This includes processing production data (Level 0) from EDOS to higher levels, distributing and receiving science data from the Instrument Teams' Science Computing Facilities (SCFs). ECS also provides information management, data archive and data distribution functions

for the TERRA and AQUA missions and other NASA Earth science flight missions, NASA Earth science instruments flown on non-NASA flight missions and for other NASA held Earth science data.

ECS science system operational elements are or will be deployed to the locations shown below:

- Distributed Active Archive Centers (DAACs):
- EROS Data Center (EDC) -- Sioux Falls, South Dakota
- Goddard Space Flight Center (GSFC) -- Greenbelt, Maryland
- Langley Research center (LaRC) -- Hampton, Virginia
- National Snow and Ice Data Center (NSIDC) -- University of Colorado, Boulder, Colorado

In addition, ECS science operations are supported by the following activities at the ECS Development Facility, Upper Marlboro, Maryland:

- ECS System Integrated Logistics Support (ILS)
- ECS Science System Operations Support (SOS)
- ECS Maintenance and Operations Management

## 5.2 System Transitions

- **Transition Plan 4PX to 4PY, 4PY to 5A, and 5A to 5B for the ECS Project [Document Number 211-TP-005]**

The objective of this transition plan is to provide a road map for the progression from the Release 4PX baseline to 4PY, 5A and 5B. It is intended to establish the processes and steps that will be used to evolve ECS from one version to the next and should satisfy the need for a common understanding of the ECS Custom Software transition approach both internally and at the DAACs.

Transition as used in the context of this document is between major custom software releases. The distinguishing factors are the change in format or organization of persistent data (databases, configuration parameters, etc.), the addition of new functionality, and the need to quiesce the system and perform an ECS Coldstart. COTS upgrades and Custom Software patch releases are not covered by transition planning when there is no change to the persistent data, and the ECS system can be Warmstarted. A COTS upgrade and/or patch release will need to be examined to determine if it qualifies to be included in a Custom Software Transition. In general, these upgrades are covered in detail in the DID 335 COTS Deployment Plan.

There are three goals that drive our transition approach:

- Avoid any data loss or data corruption
- Minimize the amount of operational downtime

- Reduce the staff required to perform transitions (ECS and DAAC personnel)

This can be summarized by the need to install the upgrade or release with the greatest possible speed while ensuring that the existing data are not affected.

- **Transition Plan 5B to 6A for the ECS Project [Document Number 211-TP-006]**

This document provides the transition plan of the ECS system at each of the four DAACs from the release 5B to release 6A.

This transition plan is intended to identify the high level processes that will be used to transition ECS from the release 5B to the release 6A. This document is intended to satisfy the need for a common understanding of the ECS custom software transition approach both internally and at the DAACs. This document is not intended to provide the detailed procedures that must be followed to implement the transition. That information will be provided in an Install Instruction document to be provided separately.

This plan describes activities for the transition of the ECS system from Release 5B to Release 6A only. This plan describes transition activities at the GSFC, EDC, LaRC and NSIDC DAACs. The plan describes transition only of ECS custom software components. All schedule-related information for this transition is maintained in the ECS Primavera schedule.

- **Transition Plan 6A.04 to 6A.XX (6A.05) for the ECS Project [Document Number 211-TP-007]**

This document provides the transition plan of the ECS system at each of the four DAACs from the release 6A.04 to release 6A.XX (6A.05).

This transition plan is intended to identify the high level processes that will be used to transition ECS from the release 6A.04 to the release 6A.XX (6A.05). This document is intended to satisfy the need for a common understanding of the ECS custom software transition approach both internally and at the DAACs. This document is not intended to provide the detailed procedures that must be followed to implement the transition. That information will be provided in an Install Instruction document to be provided separately.

This plan describes activities for the transition of the ECS system from Release 6A.04 to Release 6A.XX (6A.05) only. This plan describes transition activities in the VATC and at GSFC, EDC, LaRC and NSIDC DAACs. The plan describes transition only of ECS custom software components. All schedule-related information for this transition is maintained in the ECS Primavera schedule.

- **Procedures for the Transition of ECS into the Solaris 8 Environment [Document Number 224-WP-001]**

The purpose of this document is to serve as a guide for the transitioning of ECS SUN machines' operating system from Solaris 2.5.1 to Solaris 8. This document provides an overview of the transition activities, identifies COTS products affected by the transition, and hardware changes necessary to implement the operating system transition.

**Release Notes** - Below is a sampling of the Release Notes provided for commercial-off-the-shelf products installed causing transitions in the ECS operational system. There are many more release notes provided on a web site. The rest of the release notes can be found at the http://pete.hitc.com/baseline/index.html web site and clicking on the Release Notes button. Once the screen is up, the user can select a set of release notes by clicking on the 914 document of choice.

- **Remedy 4.5.2 Maintenance Upgrade for the ECS Project [Document Number 914-TDA-197]**

This document describes changes to the ECS Commercial-off-the-shelf (COTS) software baseline for deploying Remedy Action Request System (ARS) 4.5.2 as part of the ECS Solaris 8 upgrade. Remedy ARS software and patches will be distributed for installation at all DAAC sites.

This document:

- Identifies the new version release and the delivery of the COTS software
- Identifies the Remedy ARS software as version 4.5.2
- Contains ECS specific installation instructions
- Identifies vendor documentation
- Identifies known bugs delivered with this COTS package

This document provides information needed to upgrade from Remedy ARS 3.2.1 to Remedy ARS 4.5.2 at all ECS sites. The document identifies the baseline and patch level of the delivery. It also provides an inventory of the delivery, list of fixed NCRs, and special operating instructions where applicable.

- **AMASS Version 5.2.1 Maintenance Upgrade for the ECS Project [Document Number 914-TDA-200]**

This release supports a new version of Archive Management and Storage System (AMASS) for the EOSDIS Core System (ECS) Project. The previous version of AMASS (5.1.1) has not been certified by ADIC IRIX 6.5.14m. AMASS 5.1.1 is not compatible with IRIX 6.5.14m. AMASS 5.2.1 is an upgrade of the previous AMASS COTS product (AMASS 5.1.1) and has been verified on both ORIGIN and CHALLENGE platforms under the Silicon Graphics Incorporated (SGI) IRIX 6.5.14m Operating System. This release provides enhancements and corrections to problems encountered in the previous version of AMASS.

This document describes the contents of the COTS delivery that will be made available to all the DAACs (Goddard Space Flight Center (GSFC), EROS Data Center (EDC), Langley research Center (LaRC), and National Snow & Ice Data Center (NSIDC)) and the ECS Development Facility (EDF) Performance Verification Center (PVC) and Verification and Test Center (VATC), for archive storage management. This document identifies the baseline upgrades, software versions, and locations of the installed COTS products. It also provides an inventory of the delivery, and special operating instructions where applicable.

- **SGI IRIX 6.5.6/6.5.9/6.5.14 Operating System Installation and Upgrade for the ECS Project [Document Number 914-TDA-201]**

An upgrade of all SGI machines to IRIX 6.5.14m is planned. This document is to provide instructions for upgrading all IRIX 6.5.x machines at the DAAC sites. Installation and upgrade for 6.5.6m, 6.5.9m and 6.5.14m IRIX Operating System releases will be covered in this PSR.

This release will also provide delivery and installation of an upgrade of SGI MIPSpro compilers and ProDev Workshop tools as an installation option with the installation or upgrade of the IRIX Operating System version.

This document describes the contents of the COTS delivery that will be made available to all of the DAACs. This document identifies the baseline upgrades, software versions, and locations of the installed COTS products. It also provides an inventory of the package and special operating instructions where applicable.

## 5.3 System Operations Support

- **Interim Release One (Ir1) Maintenance and Operations Procedures [Document Number 609-CD-001]**

The Interim Release One (Ir1) Maintenance and Operations Procedures, Contract Data Requirements List (CDRL) item 116, whose requirements are specified in Data Item description (DID) 609/OP1, is a required deliverable under contract NAS5-60000.

This document describes the purpose and functions of Interim Release One of ECS (Ir1) and its components from an operations standpoint. This document provides background information that is the basis for the *Interim Release One (Ir1) Operator's Manual for the ECS Project* (DID) 611/OP3). This document is intended to provide an operations overview that (1) supports the development of detailed science software integration and test procedures by the ECS Science Office, (2) supports TRMM interface testing, and (3) supports the use of the system by ECS maintenance and operations (M&O) staff.

This document applies to Ir1, and not to any subsequent releases of ECS. ECS M&O staff and the ECS Science Office intend it for use during the period in which Ir1 is used.

- **Release B Special Maintenance and Test Equipment for the ECS Project [Document Number 615-CD-002]**

This document will identify the special maintenance and test equipment required to support the ECS Release B design.

The purpose and scope of this document are set by the ECS SOW, paragraph 3.8.3.2.2, which states that "Special maintenance and test equipment shall be used only if COTS equipment is unavailable." Based upon the total COTS hardware solution selected for Release B, there is no special maintenance or test equipment required to support the Release B architecture.

Requirements for general test and support equipment will be identified in the Test and Support Equipment Requirements List (DID 619/CDRL 125) to be submitted prior to the CDR for each release and updated prior to the RRR for each release.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with Ecs technical direction #11, dated December 6, 1994.

- **Operations Concept for the ECS Project: Part 2B - ECS Release B [Document Number 604-CD-002]**

This document is Part 2B of the ECS Operations Concept Document (OCD). It is submitted as required by Data Item Description (DID) 604/OP1 for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This OCD Part 2B establishes the ECS release B mission support, describes the ECS processes, provides overviews of the activities at each release B ECS site (including a Day in the Life of each site) and describes some system level (i.e., cross site) system scenarios. The OCD Part 2B provides guidance to system engineers during the system design phase to ensure that the system architecture and design supports the mission operational concepts and system users'/providers' needs. Additionally, the OCD Part 2s:

- Provide a configurable basis for detailed scenarios in other project documents that contain scenarios, such as test and acceptance plans and procedures and in the Operations Scenarios Document (605/OP2)
- Provide guidance for the establishment of staffing plans
- Define operational roles
- Help to define the performance of the individual system elements and the performance between those functional elements
- Provide initial material for development of the more detailed operation and maintenance procedures

The OCD Part 2s are release-specific and make specific references to detailed scenarios that are to be published in the Operations Scenario document (DID 605) and in Software Development Folders. The difference between the IDR and CDR versions of the OCD Part 2s is the level of detail in references to the DID 605 scenarios. The IDR version identifies the detailed scenarios that need to be written as part of the design cycle. The CDR version will reference specific scenarios found in DID 605.

This OCD Part 2B document describes the Operations Concept for Release B of ECS. The OCD Part 2s are Release and site specific for each Release and are separately identified as OCD Part 2a for Release A, OCD Part 2B for Release B, etc.

This document reflects the February 14, 1996 Technical Baseline, maintained by the Contracts Configuration Control Board in accordance with ECS Technical Direction Number 11, dated

December 6, 1994. It is anticipated that GSFC's contractual compliance documentation will be revised to be consistent with the Technical Baseline.

This document provides the operations concept for the science data processing and system management activities of ECS Release B. These activities are performed at the DAACs and the SMC. Operations concepts for the Flight Operations performed at the EOC can be found in the Flight Operations Segment (FOS) Operations Concept for the ECS Project Volume 2 document, 604-CD-004-001.

- **Release B SDPS/CSMS Operations Scenarios for the ECS Project [Document Number 605-CD-002]**

This document is intended as the final submittal of ECS Operations Scenarios Document for Release B. It is submitted as required by Data Item Description (DID) 605/OP2 for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document describes the Operations Scenarios of the ECS as delivered at Release B.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

This document provides detailed work flow analysis of all key interactions between the DAAC Operations staff and the ECS. Where appropriate non-DAAC personnel have been identified in the supporting scenario material.

- **ECS Maintenance and Operations Position Descriptions [Document Number 607-CD-001]**

This document, Contract Data Requirements List (CDRL) item 114, whose requirements are specified in Data Item Description (DID) 607/OP2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The EOSDIS, as the National Aeronautics and Space Administration's (NASA) overall Earth Science discipline data system, provides the ground system for the collection and analysis of science data to support scientists in resolving the dynamics of the Earth's components and the processes by which they interact. As part of the EOS program, EOSDIS supports: the planning, scheduling and control of the EOS series of spacecraft; exchanging commands data and algorithms with the European Space Agency (ESA), Japan, Canada, the National Oceanic and Atmospheric Administration (NOAA) and any other non-NASA entities involved in the overall EOS mission; the coordination of these activities with other data gathering systems and the transformation of the observations into physical variables, providing for higher levels of processing and presenting the data to users in forms that facilitate and stimulate interactive scientific research. The portion of EOSDIS addressed in this document is the EOSDIS Core System (ECS).

The purpose of this document is to identify the Ecs operators, operations support and engineering staff positions, describe their roles, responsibilities and interactions and identify their software tools required to operate the ECS system and successfully execute mission operations. As illustrated in Figure 1-1, the roles, responsibilities, staff interactions and tools described were derived from and are intended to be consistent with the system functions and capabilities specified in the ECS design specifications and the operations activities described in the ECS Operations Concept document. In addition, the Maintenance and Operations Management Plan for the ECS Project provides the ECS M&O Statement of Work tasks in a contractor organizational structure. Consistent with that organizational structure, this document further identifies the operator positions and allocates the operations responsibilities to those positions.

This identification of positions and assignment of roles and responsibilities provides a model required to complete the operations concept and a basis for development of staffing profiles and forecasting of staffing costs. The actual assignment of operations positions and allocation of roles and responsibilities can be modified and tailored by each Site Manager (DAAC, SMC or EOC)/ESDIS to adapt to their site's configuration, missions and workloads.

The Systems Monitoring and Coordination Center (SMC), System Engineering Organization (SEO) and Distributed Active Archive Centers (DAACs) operational roles and software tools described in this document are intended to be consistent with the functionality and capabilities provided by the Science Data Processing Segment (SDPS) and Communications and System Management Segment (CSMS) Release B of ECS and are those required to support the following mission operations:

1. Follow-on TRMM science software integration and test
2. TRMM on-orbit science data operations
3. Landsat-7 readiness and on-orbit science data operations
4. V0-V1 data migration and V0-V1 inter-operation
5. AM-1 science software integration and test, interface testing and on-orbit science data operations
6. Archive and distribution of ORNL and ASF science data
7. Other spacecraft/instrument missions (e.g., COLOR and ADEOS II)

The EOS Operations Center (EOC) roles and responsibilities described in this version are those required to execute AM-1 flight operations with the support of ECS Release B Flight Operations Segment (FOS) capabilities. Later versions of this document will address M&O roles for subsequent ECS releases and missions.

The ECS system operators, operations support and engineering roles and responsibilities are the focus of this document. The operations management practices and organizational structure are described in DID 601, Maintenance and Operations Management Plan. Operations staffing levels for the operators described will vary by site and mission workload and are not a subject of this

document, but are described in DID 608, ECS Operations Plan. Descriptions of how the system is operated are contained in DID 604, ECS Ops Concepts document; DID 605, SDPS/CSMS Operations Scenarios; and DID 611, Mission Ops Procedures. Descriptions of the operating characteristics of the operations software tools can be found in DID 305, Design Specification or DID 609, Operations Tools Manual.

This document reflects the February 14, 1996 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction Number 11, dated December 6, 1994.

- **Release 4 Operations Tools Manual for the ECS Project [Document Number 609-CD-003]**

The Release 4 Operations Tools Manual, Contract Data Requirements List (CDRL) item 116, whose requirements are specified in the revised Data item Description (DID) 609/OP1, is a required deliverable under contract NAS5-60000.

This document describes the human-machine interface (HMI) characteristics of the tools (configuration items) that will be used by the ECS operations staff when performing the following:

- Computer systems administration
- System monitoring
- Configuration management
- Security and accountability
- Science software integration and testing
- Resource planning
- Production planning and processing
- Science data ingest, archive and distribution
- User services
- Common services

This document provides background information that is the basis for the *Release 4 Operations Procedures for the ECS Project* (DID 611/OP3). The 609 document is intended to (1) familiarize the ECS operators with their tools, (2) be used as a reference for all ECS operational tasks, and (3) be used as an aid during training of ECS operations staff.

The document applies to *Release 4*, and not to any subsequent releases of the ECS. This document is limited to (1) a detailed description of customized operator tools, (2) a brief description of COTS software used by operations and references to the applicable vendor manuals, and (3) a detailed description of customized commercial-off-the-shelf (COTS) software. This document will point to DID 611 for all operational procedures or to individual COTS manuals for detailed COTS instructions. Operators and maintainers of the ECS system intend it for use during the period in which *Release 4* is used.

- **Release 5A Operations Tools Manual for the ECS Project [Document Number 609-CD-500]**

The Release 5A Operations Tools Manual, Contract Data Requirements List (CDRL) item 116, whose requirements are specified in the revised Data item Description (DID) 609/OP1, is a required deliverable under contract NAS5-60000.

This document describes the human-machine interface (HMI) characteristics of the tools (configuration items) that will be used by the ECS operations staff when performing the following:

- Computer systems administration
- System monitoring
- Configuration management
- Security and accountability
- Science software integration and testing
- Resource planning
- Production planning and processing
- Science data ingest, archive and distribution
- User services
- Common services

This document provides background information that is the basis for the *Release 5A Operations Procedures for the ECS Project* (DID 611/OP3). The 609 document is intended to (1) familiarize the ECS operators with their tools, (2) be used as a reference for all ECS operational tasks, and (3) be used as an aid during training of ECS operations staff.

The document applies to *Release 5A*, and not to any subsequent releases of the ECS. This document is limited to (1) a detailed description of customized operator tools, (2) a brief description of COTS software used by operations and references to the applicable vendor manuals, and (3) a detailed description of customized commercial-off-the-shelf (COTS) software. This document will point to DID 611 for all operational procedures or to individual COTS manuals for detailed COTS instructions. Operators and maintainers of the ECS system intend it for use during the period in which *Release 5A* is used.

- **Release 5B Operations Tools Manual for the ECS Project [Document Number 609-CD-510]**

The Release 5B Operations Tools Manual, Contract Data Requirements List (CDRL) item 116, whose requirements are specified in the revised Data item Description (DID) 609/OP1, is a required deliverable under contract NAS5-60000.

This document describes the human-machine interface (HMI) characteristics of the tools (configuration items) that will be used by the ECS operations staff when performing the following:

- Computer systems administration
- System monitoring
- Configuration management
- Security and accountability
- Science software integration and testing
- Resource planning
- Production planning and processing
- Science data ingest, archive and distribution
- User services
- Common services

This document provides background information that is the basis for the *Release 5B Operations Procedures for the ECS Project* (DID 611/OP3). The 609 document is intended to (1) familiarize the ECS operators with their tools, (2) be used as a reference for all ECS operational tasks, and (3) be used as an aid during training of ECS operations staff.

The document applies to *Release 5B*, and not to any subsequent releases of the ECS. This document is limited to (1) a detailed description of customized operator tools, (2) a brief description of COTS software used by operations and references to the applicable vendor manuals, and (3) a detailed description of customized commercial-off-the-shelf (COTS) software. This document will point to DID 611 for all operational procedures or to individual COTS manuals for detailed COTS instructions. Operators and maintainers of the ECS system intend it for use during the period in which *Release 5B* is used.

- **Release 6A Operations Tools Manual for the ECS Project [Document Number 609-CD-600]**

The Release 6A Operations Tools Manual, Contract Data Requirements List (CDRL) item 116, whose requirements are specified in the revised Data item Description (DID) 609/OP1, is a required deliverable under contract NAS5-60000.

This document describes the human-machine interface (HMI) characteristics of the tools (configuration items) that will be used by the ECS operations staff when performing the following:

- Computer systems administration
- System monitoring
- Configuration management
- Security and accountability
- Science software integration and testing
- Resource planning
- Production planning and processing

- Science data ingest, archive and distribution
- User services
- Common services

This document provides background information that is the basis for the *Release 6A Operations Procedures for the ECS Project* (DID 611/OP3). The 609 document is intended to (1) familiarize the ECS operators with their tools, (2) be used as a reference for all ECS operational tasks, and (3) be used as an aid during training of ECS operations staff.

The document applies to *Release 6A*, and not to any subsequent releases of the ECS. This document is limited to (1) a detailed description of customized operator tools, (2) a brief description of COTS software used by operations and references to the applicable vendor manuals, and (3) a detailed description of customized commercial-off-the-shelf (COTS) software. This document will point to DID 611 for all operational procedures or to individual COTS manuals for detailed COTS instructions. Operators, maintainers and external users of the ECS intend it for use during the period in which *Release 6A* is operational.

- **Interim Release 1 (Ir1) Operator's Manual for the ECS Project [Document Number 611-CD-001]**

This document is submitted as Contract Data Requirements List (CDRL) item 117, DID 611/OP3 under contract NAS5-60000.

The purpose of the Ir1 Operator's Manual is to detail the major operations procedures and operations instructions that M&O System Administrators need to know to support the objectives of the Ir1 delivery. Operations procedures are defined as the step by step commands or on-line procedures needed to perform a function. The Operations Instructions are the off-line procedures or directives for performing administrative, operations, management or operations support activities (e.g., Configuration Management, Problem Management, Performance Reporting, etc.). This document will also be used as a training aid for M&O staff that are located at the sites.

This document is limited to the operations procedures and instructions that the Maintenance and Operations (M&O) staff will need to achieve the Ir1 objectives. Since Ir1 is not an operational release (the system is used for testing with no products being produced), the M&O functions will be relegated to mainly system administration type activities. The testing of the system and science software will be the responsibility of the developers, Science Office and Instrument Teams and the procedures for this testing will be documented in their test plans. However, the M&O support for this testing will be documented in this document.

- **Mission Operation Procedures for the ECS Project [Document Number 611-CD-004]**

This document, Mission Operation Procedures for the Version 2 Release 2.0 system for ECS, provides Maintenance and Operations (M&O) procedures to configure, maintain and operate the Version 2 Release 2.0 ECS.

This document meets the milestone specified as Contract Data Requirements List (CDRL) item 117, DID 611/OP3 under contract NAS5-60000. It reflects the ECS as delivered at Version 2 Release 2.0.

The purpose of this document is to identify the procedures and instructions to operate and maintain Release B systems. In addition, DAAC staff responsibilities are identified. The DAAC M&O staff is comprised of operators, engineers, as well as operations support, administration and management staff personnel.

This document will also be used as a training aid for M&O staff who are located at the sites. The operations procedures and operations instructions were derived from and are intended to be consistent with, the system functions and capabilities specified in the ECS design specifications and the operations activities described in the ECS Operations Concept document.

The scope of this document is directed to DAAC M&O activities to support the Version 2 Release 2.0 ECS. Both procedures and instructions are identified. Operational procedures are defined as step-by-step commands or on-line procedures needed to perform a function. The Operations Instructions are the off-line procedures or directives for performing administrative, operations, management or operations support activities (e.g., Configuration Management, problem Management, Performance Reporting, etc.).

- **Mission Operations Procedures for the ECS Project - Release 5A [Document Number 611-CD-500]**

This document, Mission Operation Procedures for the Release 5A system for ECS, provides Maintenance and Operations (M&O) procedures to configure, maintain and operate the Release 5A ECS.

This document meets the milestone specified as Contract Data Requirements List (CDRL) Item 117, DID 611/OP3 under contract NAS5-60000. It reflects the ECS as delivered at Release 5A.

The purpose of this document is to identify the procedures and instructions to operate and maintain Release 5A systems. In addition, DAAC staff responsibilities are identified. The DAAC M&O staff is comprised of operators, engineers, as well as operations support, administration and management staff personnel.

This document will also be used as a training aid for M&O staff who are located at the sites. The operations procedures and operations instructions were derived from, and are intended to be consistent with, the system functions and capabilities specified in the ECS design specifications and the operations activities described in the ECS Operations Concept Document.

The scope of this document is directed to DAAC M&O activities to support the Release 5A ECS system. Both procedures and instructions are identified. Operations procedures are defined as the step-by-step commands or on-line procedures needed to perform a function. The Operations Instructions are the off-line procedures or directives for performing administrative, operations, management or operations support activities (e.g., Configuration Management, Problem Management, Performance Reporting, etc.).

- **Mission Operations Procedures for the ECS Project - Release 5B [Document Number 611-CD-510]**

This document, Mission Operation Procedures for the Release 5B system for ECS, provides Maintenance and Operations (M&O) procedures to configure, maintain and operate the Release 5B ECS.

This document meets the milestone specified as Contract Data Requirements List (CDRL) Item 117, DID 611/OP3 under contract NAS5-60000. It reflects the ECS as delivered at Release 5B.

The purpose of this document is to identify the procedures and instructions to operate and maintain Release 5B systems. In addition, DAAC staff responsibilities are identified. The DAAC M&O staff is comprised of operators, engineers, as well as operations support, administration and management staff personnel.

This document will also be used as a training aid for M&O staff who are located at the sites. The operations procedures and operations instructions were derived from, and are intended to be consistent with, the system functions and capabilities specified in the ECS design specifications and the operations activities described in the ECS Operations Concept Document.

The scope of this document is directed to DAAC M&O activities to support the Release 5B ECS system. Both procedures and instructions are identified. Operations procedures are defined as the step-by-step commands or on-line procedures needed to perform a function. The Operations Instructions are the off-line procedures or directives for performing administrative, operations, management or operations support activities (e.g., Configuration Management, Problem Management, Performance Reporting, etc.).

- **Mission Operations Procedures for the ECS Project - Release 6A [Document Number 611-CD-600]**

This document, Mission Operation Procedures for the Release 6A system for ECS, provides Maintenance and Operations (M&O) procedures to configure, maintain and operate the Release 6A ECS.

This document meets the milestone specified as Contract Data Requirements List (CDRL) Item 117, DID 611/OP3 under contract NAS5-60000. It reflects the ECS as delivered at Release 6A.

The purpose of this document is to identify the procedures and instructions to operate and maintain Release 6A systems. In addition, DAAC staff responsibilities are identified. The DAAC M&O staff is comprised of operators, engineers, as well as operations support, administration and management staff personnel.

This document will also be used as a training aid for M&O staff who are located at the sites. The operations procedures and operations instructions were derived from, and are intended to be consistent with, the system functions and capabilities specified in the ECS design specifications and the operations activities described in the ECS Operations Concept Document.

The scope of this document is directed to DAAC M&O activities to support the Release 6A ECS system. Both procedures and instructions are identified. Operations procedures are defined as the

step-by-step commands or on-line procedures needed to perform a function. The Operations Instructions are the off-line procedures or directives for performing administrative, operations, management or operations support activities (e.g., Configuration Management, Problem Management, Performance Reporting, etc.).

- **EDC DAAC M&O Equipment [Document Number 840-TP-001]**

The purpose of this document is to present an overview description of the maintenance and operations hardware (HW) used by the EDC DAAC staff to monitor, analyze, report and mange the operational HW and software (SW). This document has been written to describe the essential hardware components and is intended to document the HW and SW configurations.

Appendix A contains a description of DAAC supplied, non-ECS procured HW that has been added to the ECS M&O network. This HW is not covered by this specification but is provided for reference purposes.

- **GSFC DAAC M&O Equipment [Document Number 840-TP-002]**

The purpose of this document is to present an overview description of the maintenance and operations hardware (HW) used by the GSFC DAAC and SMC staff to monitor, analyze, report and mange the operational HW and software (SW). This document has been written to describe the essential hardware components and is intended to document the HW and SW configurations.

- **NSIDC DAAC M&O Equipment [Document Number 840-TP-003]**

The purpose of this document is to present an overview description of the maintenance and operations hardware (HW) used by the LaRC DAAC staff to monitor, analyze, report and mange the operational HW and software (SW). This document has been written to describe the essential hardware components and is intended to document the HW and SW configurations.

- **LaRC DAAC M&O Equipment [Document Number 840-TP-004]**

The purpose of this document is to present an overview description of the maintenance and operations hardware (HW) used by the EDC DAAC staff to monitor, analyze, report and mange the operational HW and software (SW). This document has been written to describe the essential hardware components and is intended to document the HW and SW configurations.

Appendix A contains a description of DAAC supplied, non-ECS procured HW that has been added to the ECS M&O network. This HW is not covered by this specification but is provided for reference purposes.

## 5.4 Systems Training

The following documents provide the training material used to train ECS project, DAAC M&O personnel and government personnel about the project.

- **ECS Project Training Material Volume 1 Introduction and System Overview - Pre-Release B Testbed [Document Number 456-TP-001]**

Training Material Volume 1 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC).

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for a general understanding of the ECS. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation.

Training Material Volume 1 includes descriptions of the ECS Pre-Release B Testbed ("Testbed") mission, goals, objectives, structure, functions, products, services and users. In addition, it provides an opportunity to gain some familiarity with an actual ECS facility and the ECS desktop. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 2: Problem Management [Document Number 456-TP-002]**

Training Material Volume 2 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC), under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding problem management. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 2 describes the process and procedures by which trouble tickets are submitted and updated. In addition, the lesson describes in general terms the processes by which problems submitted on trouble tickets are investigated and solutions are identified and implemented. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 3: Production Planning [Document Number 456-TP-003]**

Training Material Volume 3 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC).

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 3 describes the procedures by which the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 4: Science Software Integration & Test [Document Number 456-TP-004]**

Training Material Volume 4 is part of a series of Technical Papers that will be used to teach M&O concepts to the M&O staff at the LaRC, NSIDC and EDC DAACs.

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding Science System Integration & Test (SSI&T). Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 4 defines the tasks required to perform SSI&T. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 5: System Administration [Document Number 456-TP-005]**

Training Material Volume 5 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC).

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding system administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 5: System Administration defines the steps required to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 7: Database Administration [Document Number 456-TP-007]**

Training Material Volume 7 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC).

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding database administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 7: Database Administration is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 8: Configuration Management [Document Number 456-TP-008]**

Training Material Volume 8 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC).

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding Configuration Management. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 8 describes the processes and procedures for Maintenance and Operations configuration management of ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 9: System Troubleshooting [Document Number 456-TP-009]**

Training Material Volume 9 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC.

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding System Troubleshooting. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 9 describes the process and procedures for ECS System Troubleshooting. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 10: Software Maintenance [Document Number 456-TP-010]**

Training Material Volume 10 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC.

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding ECS software maintenance. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 10 describes the processes and procedures to accomplish ECS Software Maintenance functions. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

- **ECS Project Training Material Volume 1: Course Outline - Release 4 [Document Number 625-CD-001]**

Training Material Volume 1 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The course outline provides a detailed path that forms the basis for curriculum development as well as course conduct. Lesson objectives will be formed using the course outline. The lesson objectives will serve as the basis for Student Guide and slide presentation material development. Once the course outline is completed, curriculum development can be completed and subsequent training courses can be conducted.

Training Material Volume 1 defines the tasks required to operate ECS. The Operator Training course is designed to provide the operations staff with sufficient knowledge and information to configure and operate the system.

- **ECS Project Training Material Volume 2: Introduction and System Overview [Document Number 625-CD-002]**

Training Material Volume 2 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a course of instruction that forms the basis for a general understanding of the ECS. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 2 includes descriptions of the ECS Version 2.0 mission, goals, objectives, structure, functions, products, services and users. In addition, it provides an opportunity to gain some familiarity with an actual ECS facility and the ECS desktop. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 3: Problem Management [Document Number 625-CD-003]**

Training Material Volume 3 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding problem management. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 3 describes the process and procedures by which trouble tickets are submitted and updated. In addition, the lesson describes in general terms the processes by which problems submitted on trouble tickets are investigated and solutions are identified and implemented. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 4: System Administration [Document Number 625-CD-004]**

Training Material Volume 4 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Network Administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 4: System Administration defines the steps required provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 6: Production Planning and Processing [Document Number 625-CD-006]**

Training Material Volume 6 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 6 describes the procedures by which the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 7: Resource Planning [Document Number 625-CD-007]**

Training Material Volume 7 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding resource planning. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 7 describes the procedures by which ECS personnel prepare resource reservation requests and resource planners prepare resource plans. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 8: Ingest [Document Number 625-CD-008]**

Training Material Volume 8 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Ingest. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 8 describes the process and procedures for Ingest of data into ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 9: Data Distribution [Document Number 625-CD-009]**

Training Material Volume 9 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding data distribution. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 9 describes the process and procedures for data distribution. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Training Material Volume 10: Archive Processing [Document Number 625-CD-010]**

Training Material Volume 10 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding data archiving. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 10 describes the process and procedures associated with Archive Processing. It describes archive hardware, software and data. In addition, it addresses starting and shutting down the tape archive control software, monitoring archive requests and performing archive management tasks. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 11: Database Administration [Document Number 625-CD-011]**

Training Material Volume 11 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this lesson is to provide a detailed course of instruction that forms the basis for understanding Database Administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 11 describes the processes and procedures required to accomplish Database Administration. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 12: Configuration Management [Document Number 625-CD-012]**

Training Material Volume 12 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Configuration Management. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 12 describes the processes and procedures for Maintenance and Operations configuration management of ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 13: User Services [Document Number 625-CD-013]**

Training Material Volume 13 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding User Services. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 13 describes the processes and procedures to accomplish ECS User Services functions. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 16: Science Software Integration and Test [Document Number 625-CD-016]**

Training Material Volume 16 is part of a series of training material that will be used to teach M&O concepts to the M&O staff at the GSFC, LaRC, NSIDC and EDC DAACs.

The purpose of this training material is to provide a detailed course of instruction that forms the basis for understanding Science Software Integration & Test (SSI&T). Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 16 defines the tasks required to perform SSI&T. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Training Material Volume 17: System Troubleshooting [Document Number 625-CD-017]**

Training Material Volume 17 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required

deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding System Troubleshooting. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 17 describes the process and procedures for ECS System Troubleshooting. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **ECS Project Training Material Volume 2A: Introduction and Detailed System Overview: Science Data Processing Internal Training [Document Number 625-CD-020]**

Training Material Volume 2A is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a summary and copy of the visuals for a detailed course of instruction that forms the basis for understanding ECS overall structure and function. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 2A provides an introduction and detailed system overview of ECS Release 4 design and internal interfaces. It summarizes materials presented in a dynamic, animated visual presentation and includes a copy of the visuals. The instruction briefly addresses the program context of ECS within NASA's Earth Science Enterprise, introduces the systems that make up ECS at a site, describes each subsystem and its Computer Software Configuration Items (CSCIs) including system elements and interfaces, and then describes system functioning in the context of operational scenarios. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 1: Course Outline [Document Number 625-CD-501-001]**

Training Material Volume 1 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The course outline provides a detailed path that forms the basis for curriculum development as well as course conduct. Lesson objectives will be formed using the course outline. The lesson objectives will serve as the basis for Student Guide and slide presentation material development.

Once the course outline is completed, curriculum development can be completed and subsequent training courses can be conducted.

Training Material Volume 1 defines the tasks required to operate ECS. The Operator Training course is designed to provide the operations staff with sufficient knowledge and information to configure and operate the system.

- **Release 5A, ECS Project Training Material Volume 3: Problem Management [Document Number 625-CD-503-001]**

Training Material Volume 3 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding problem management. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 3 describes the process and procedures by which trouble tickets are submitted and updated. In addition, the lesson describes in general terms the processes by which problems submitted on trouble tickets are investigated and solutions are identified and implemented. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 4: System Administration [Document Number 625-CD-504-001]**

Training Material Volume 4 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Network Administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 4: System Administration defines the steps required to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 6: Production Planning and Processing [Document Number 625-CD-506-001]**

Training Material Volume 6 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required

deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 6 describes the procedures by which the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 7: Resource Planning [Document Number 625-CD-507-001]**

Training Material Volume 7 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding resource planning. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 7 describes the procedures by which ECS personnel prepare resource reservation requests and resource planners prepare resource plans. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 8: Ingest [Document Number 625-CD-508-001]**

Training Material Volume 8 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Ingest. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 8 describes the process and procedures for Ingest of data into ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 9: Data Distribution [Document Number 625-CD-509-001]**

Training Material Volume 9 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding data distribution. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 9 describes the process and procedures for data distribution. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Training Material Volume 10: Archive Processing [Document Number 625-CD-510-001]**

Training Material Volume 10 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding data archiving. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 10 describes the process and procedures associated with Archive Processing. It describes archive hardware, software and data. In addition, it addresses starting and shutting down the tape archive control software, monitoring archive requests and performing archive management tasks. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 11: Database Administration [Document Number 625-CD-511-001]**

Training Material Volume 11 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this lesson is to provide a detailed course of instruction that forms the basis for understanding Database Administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for

verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 11 describes the processes and procedures required to accomplish Database Administration. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 12: Configuration Management [Document Number 625-CD-512-001]**

Training Material Volume 12 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Configuration Management. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 12 describes the processes and procedures for Maintenance and Operations configuration management of ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 13: User Services [Document Number 625-CD-513-001]**

Training Material Volume 13 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding User Services. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 13 describes the processes and procedures to accomplish ECS User Services functions. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 16: Science Software Integration and Test [Document Number 625-CD-516-001]**

Training Material Volume 16 is part of a series of training material that will be used to teach M&O concepts to the M&O staff at the GSFC, LaRC, NSIDC and EDC DAACs.

The purpose of this training material is to provide a detailed course of instruction that forms the basis for understanding Science Software Integration & Test (SSI&T). Lesson objectives are

developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 16 defines the tasks required to perform SSI&T. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Training Material Volume 17: System Troubleshooting [Document Number 625-CD-517-001]**

Training Material Volume 17 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding System Troubleshooting. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 17 describes the process and procedures for ECS System Troubleshooting. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 18: Advanced Production Planning and Processing [Document Number 625-CD-518-001]**

Training Material Volume 18 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide.

Training Material Volume 18 provides practice in the procedures by which ECS personnel prepare resource reservation requests, resource planners prepare resource plans, and the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient skills to satisfy all lesson objectives.

- **Release 5A, ECS Project Training Material Volume 2A: Introduction and Detailed System Overview: Science Data Processing Internal Training [Document Number 625-CD-520-001]**

Training Material Volume 2A is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a summary and copy of the visuals for a detailed course of instruction that forms the basis for understanding ECS overall structure and function. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 2A provides an introduction and detailed system overview of ECS Release 5A design and internal interfaces. It summarizes materials presented in a dynamic, animated visual presentation and includes a copy of the visuals. The instruction briefly addresses the program context of ECS within NASA's Earth Science Enterprise, introduces the systems that make up ECS at a site, describes each subsystem and its Computer Software Configuration Items (CSCIs) including system elements and interfaces, and then describes system functioning in the context of operational scenarios. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 1: Course Outline [Document Number 625-CD-501-002]**

Training Material Volume 1 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The course outline highlights the learning path for curriculum development as well as course conduct. Lesson objectives will be formed using tasks listed in the course outline. These objectives will serve as the basis for Student Guide and slide presentation material development and course conduct. Once the course outline is completed, curriculum development can be completed and subsequent training courses conducted.

Training Material Volume 1 (Course Outline) provides an overview of available courses developed to support operator training for ECS. Each lesson contains a list of tasks grouped together by subject, required to operate ECS. These tasks serve as the foundation of the Operator Training course and define expectations for each lesson.

- **Release 5B, ECS Project Training Material Volume 3: Problem Management [Document Number 625-CD-503-002]**

Training Material Volume 3 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required

deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding problem management. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 3 describes the process and procedures by which trouble tickets are submitted and updated. In addition, the lesson describes in general terms the processes by which problems submitted on trouble tickets are investigated and solutions are identified and implemented. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 4: System Administration [Document Number 625-CD-504-002]**

Training Material Volume 4 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Network Administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 4: System Administration defines the steps required to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 6: Production Planning and Processing [Document Number 625-CD-506-002]**

Training Material Volume 6 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 6 describes the procedures by which the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 7: Resource Planning [Document Number 625-CD-507-002]**

Training Material Volume 7 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding resource planning. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 7 describes the procedures by which ECS personnel prepare resource reservation requests and resource planners prepare resource plans. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 8: Ingest [Document Number 625-CD-508-002]**

Training Material Volume 8 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Ingest. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 8 describes the process and procedures for Ingest of data into ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 9: Data Distribution [Document Number 625-CD-509-002]**

Training Material Volume 9 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding data distribution. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 9 describes the process and procedures for data distribution. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Training Material Volume 10: Archive Processing [Document Number 625-CD-510-002]**

Training Material Volume 10 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding data archiving. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 10 describes the process and procedures associated with Archive Processing. It describes archive hardware, software and data. In addition, it addresses starting and shutting down the tape archive control software, monitoring archive requests and performing archive management tasks. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 11: Database Administration [Document Number 625-CD-511-002]**

Training Material Volume 11 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this lesson is to provide a detailed course of instruction that forms the basis for understanding Database Administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 11 describes the processes and procedures required to accomplish Database Administration. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 12: Configuration Management [Document Number 625-CD-512-002]**

Training Material Volume 12 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Configuration Management. Lesson objectives are developed and are used to guide the flow of instruction for this lesson. The lesson objectives serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 12 describes the processes and procedures for Maintenance and Operations configuration management of ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 13: User Services [Document Number 625-CD-513-002]**

Training Material Volume 13 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding User Services. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 13 describes the processes and procedures to accomplish ECS User Services functions. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 16: Science Software Integration and Test [Document Number 625-CD-516-002]**

Training Material Volume 16 is part of a series of training material that will be used to teach M&O concepts to the M&O staff at the GSFC, LaRC, NSIDC and EDC DAACs.

The purpose of this training material is to provide a detailed course of instruction that forms the basis for understanding Science Software Integration & Test (SSI&T). Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 16 defines the tasks required to perform SSI&T. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Training Material Volume 17: System Troubleshooting [Document Number 625-CD-517-002]**

Training Material Volume 17 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required

deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding System Troubleshooting. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 17 describes the process and procedures for ECS System Troubleshooting. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 18: Advanced Production Planning and Processing [Document Number 625-CD-518-002]**

Training Material Volume 18 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide.

Training Material Volume 18 provides practice in the procedures by which ECS personnel prepare resource reservation requests, resource planners prepare resource plans, and the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient skills to satisfy all lesson objectives.

- **Release 5B, ECS Project Training Material Volume 2A: Introduction and Detailed System Overview: Science Data Processing Internal Training [Document Number 625-CD-520-002]**

Training Material Volume 2A is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a summary and copy of the visuals for a detailed course of instruction that forms the basis for understanding ECS overall structure and function. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 2A provides an introduction and detailed system overview of ECS Release 5B design and internal interfaces. It summarizes materials presented in a dynamic, animated visual presentation and includes a copy of the visuals. The instruction briefly addresses

the program context of ECS within NASA's Earth Science Enterprise, introduces the systems that make up ECS at a site, describes each subsystem and its Computer Software Configuration Items (CSCIs), including system elements and interfaces, and then describes system functioning in the context of operational scenarios. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 1: Course Outline [Document Number 625-CD-601-001]**

Training Material Volume 1 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The course outline highlights the learning path for curriculum development as well as course conduct. Lesson objectives are formed using the tasks listed in the course outline. These objectives will serve as the basis for Student Guide and slide presentation material development and course conduct. Once the course outline is completed, curriculum development can be completed and subsequent training courses conducted.

Training Material Volume 1 (Course Outline) provides an overview of available courses developed to support operator training for ECS. Each lesson contains a list of tasks grouped together by subject, required to operate ECS. These tasks serve as the foundation of the Operator Training course and define expectations for each lesson.

- **Release 6A, ECS Project Training Material Volume 3: Problem Management [Document Number 625-CD-603-001]**

Training Material Volume 3 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding problem management. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 3 describes the process and procedures by which trouble tickets are submitted and updated. In addition, the lesson describes in general terms the processes by which problems submitted on trouble tickets are investigated and solutions are identified and implemented. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 4: System Administration [Document Number 625-CD-604-001]**

Training Material Volume 4 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Network Administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 4: System Administration defines the steps required to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 6: Production Planning and Processing [Document Number 625-CD-606-001]**

Training Material Volume 6 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 6 describes the procedures by which the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 7: Resource Planning [Document Number 625-CD-607-001]**

Training Material Volume 7 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding resource planning. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 7 describes the procedures by which ECS personnel prepare resource reservation requests and resource planners prepare resource plans. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 8: Ingest [Document Number 625-CD-608-001]**

Training Material Volume 8 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Ingest. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 8 describes the process and procedures for Ingest of data into ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 9: Data Distribution [Document Number 625-CD-609-001]**

Training Material Volume 9 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding data distribution. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 9 describes the process and procedures for data distribution. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Training Material Volume 10: Archive Processing [Document Number 625-CD-610-001]**

Training Material Volume 10 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding data archiving. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 10 describes the process and procedures associated with Archive Processing. It describes archive hardware, software and data. In addition, it addresses starting and shutting down the tape archive control software, monitoring archive requests and performing archive management tasks. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 11: Database Administration [Document Number 625-CD-611-001]**

Training Material Volume 11 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this lesson is to provide a detailed course of instruction that forms the basis for understanding Database Administration. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 11 describes the processes and procedures required to accomplish Database Administration. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 12: Configuration Management [Document Number 625-CD-612-001]**

Training Material Volume 12 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding Configuration Management. Lesson objectives are developed and are used to guide the flow of instruction for this lesson. The lesson objectives serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 12 describes the processes and procedures for Maintenance and Operations configuration management of ECS. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 13: User Services [Document Number 625-CD-613-001]**

Training Material Volume 13 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding User Services. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 13 describes the processes and procedures to accomplish ECS User Services functions. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 16: Science Software Integration and Test [Document Number 625-CD-616-001]**

Training Material Volume 16 is part of a series of training material that will be used to teach M&O concepts to the M&O staff at the GSFC, LaRC, NSIDC and EDC DAACs.

The purpose of this training material is to provide a detailed course of instruction that forms the basis for understanding Science Software Integration & Test (SSI&T). Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 16 defines the tasks required to perform SSI&T. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Training Material Volume 17: System Troubleshooting [Document Number 625-CD-617-001]**

Training Material Volume 17 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding System Troubleshooting. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 17 describes the process and procedures for ECS System Troubleshooting. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 18: Advanced Production Planning and Processing [Document Number 625-CD-618-001]**

Training Material Volume 18 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide.

Training Material Volume 18 provides extensive practice in the procedures by which ECS personnel prepare resource reservation requests, resource planners prepare resource plans, and the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient skills to satisfy all lesson objectives.

- **Release 6A, ECS Project Training Material Volume 2A: Introduction and Detailed System Overview: Science Data Processing Internal Training [Document Number 625-CD-620-001]**

Training Material Volume 2A is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

The purpose of this Student Guide is to provide a summary and copy of the visuals for a detailed course of instruction that forms the basis for understanding ECS overall structure and function. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Training Material Volume 2A provides an introduction and detailed system overview of ECS Release 6A design and internal interfaces. It summarizes materials presented in a dynamic, animated visual presentation and includes a copy of the visuals. The instruction briefly addresses the program context of ECS within NASA's Earth Science Enterprise, introduces the systems that make up ECS at a site, describes each subsystem and its Computer Software Configuration Items (CSCIs), including system elements and interfaces, and then describes system functioning in the context of operational scenarios. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

# 6. ECS Project Support

This section provides documents, which support the ECS Project, to promote functions or performance or provide explanations or clarifications of concepts used in the system. These documents also provide support studies or work-arounds for functions wanted or needed by the science community. Figure 6-1 shows the documents used to support the ECS Project. These documents include white papers and technical papers. These documents can be found in their entirety at the http://edhs1.gsfc.nasa.gov/waisdata/catalog/tkscat.html web site.

Figure 6-1 is the ECS Project Support diagram. The diagram shows the support documents and software used to provide approaches, methods, explanation and support for project design, design updates, and work-arounds. The documents referenced in this section pertain to the Toolkit Software as well as various technical and white papers used to support the ECS and the project throughout the development, operational and maintenance stages.

**Note:** The Operational Support Tools are only mentioned here. These tools are the QA MUT and BMGT. They are documented separately and should be referenced through the ECS Project Data Management Office. The address for the Data Management Office is supplied in the Abstract section of this document.

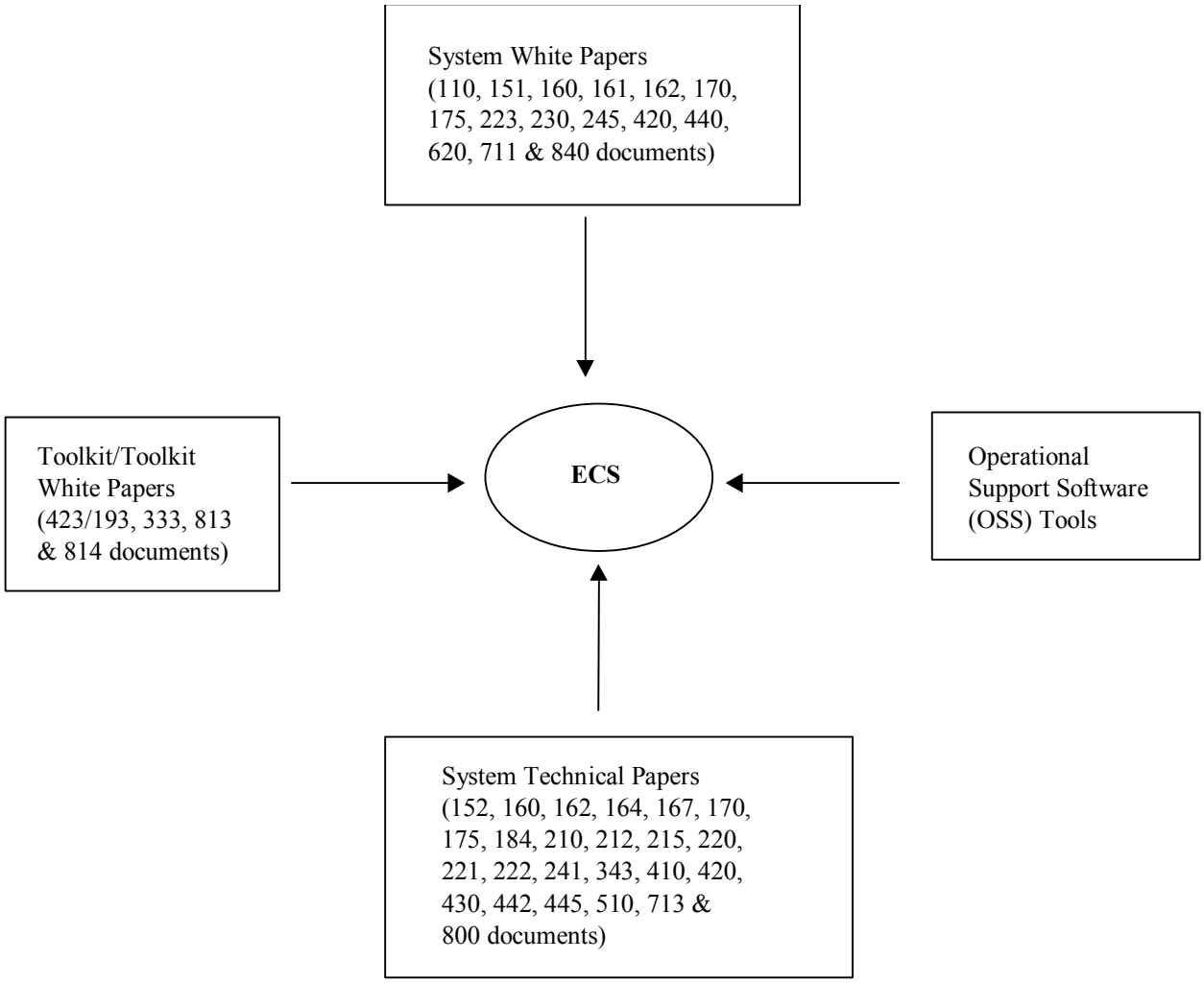


***Figure 6-1. ECS Project Support Documents***

## 6.1 Toolkit and Toolkit White Papers

- **PGS Toolkit Requirements Specification for the ECS Project [Document Number 423-16-02] (a.k.a. 193-801-SD4)**

This document is a modification of the Product Generation System (PGS) Toolkit Requirements Specification for the Earth Observing System Data Information System (EOSDIS) Core System (ECS) Project, October 29, 1993, (193-801-SD4-001). These modifications are based on the suggested changes from the Earth Observing System (EOS) instrument data processing teams, Earth Science Data and Information System (ESDIS) representatives and ECS architecture changes in the year since the original document's introduction.

This document is unavailable on the ESDIS Master Documents (Temporary Repository) web site.

- **Instrument Support Toolkit Prototype Usability Test Plan for the ECS Project [Document Number 813-RD-008]**

The purpose of this test plan is to define an approach for testing the Instrument Support Toolkit (IST) prototype usability. The IST is a user interface tool providing access to EOC functions. The EOC is responsible for high-level monitoring and control of all U.S. Spacecraft and all instruments on-board the U.S. EOS spacecraft. It will maintain spacecraft and instrument health and safety, monitor spacecraft performance, perform spacecraft engineering analysis and perform high-level monitoring of the mission performance of the instruments. The IST will be delivered to the Principal Investigator/Team Lead (PI/TL) sites for U.S. EOS instruments. This enables PIs and TIs who are not physically located at the EOC to participate in the planning, scheduling, commanding, monitoring and analysis of their instruments. The IST prototype deign is based on the level 3 FOS requirements defined in the ECS Requirements Specification for monitoring and controlling the spacecraft and instruments.

In the early phase of prototype development, the IST development team held discussions with typical end users. These discussions were highly successful in understanding the needs of the user. The feedback from the discussions, surveys and questionnaires was incorporated into the prototype. During the current phase of development, usability testing will provide empirical data to supplement the subjective feedback received.

The testing described in this plan highlights the major features and functionality of the IST. The tasks described in the test plan exercise these functions and how the user interacts with the IST, providing for an evaluation of the usability of the toolkit.

- **SCF Toolkit 5.2.8 for the ECS Project [Document Number 814-RD-607]**

The SDP Toolkit and related software have been developed by Raytheon Systems Company (RSC) in support of the EOSDIS Core System (ECS) project. The software will be used by data production software developers and scientists as a part of code development at their Science Computing Facilities (SCF) and later encapsulates that code in Distributed Active Archive Center (DAAC) computing facilities. The HDF-EOS libraries are used by consumers of EOS products to access and manipulate data structures. These products range from calibrated Level 1 to Level 4 model data.

SDP Toolkit 5.2.8 and HDF-EOS 2,8 are versions that match ECS software, Drop 6A.07, to be installed at DAAC facilities in the latter portion of the year 2002.

This document describes the contents of the package delivery for SCF Toolkit 5.2.8 for the ECS Project; matching functionality in ECS Drop 6A.07. The document identifies the baseline and patch level of the delivery. It also provides an inventory of the delivery, list fixed NCRs and special operating instructions where applicable.

- **Release 5A SDP Toolkit Users Guide for the ECS Project [Document Number 333-CD-500]**

The SCF Toolkit Users Guide for the ECS Project is a part of the Science Data Production (SDP) Toolkit delivery made under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It was first delivered in January 1994. The current Users Guide is updated for the Release 5A Toolkit delivery made in June 1999. The SCF Toolkit Users Guide for the ECS Project will be updated for each major release of the SDP Toolkit.

This document is aimed at the EOS data production software developers and scientists who will use the SDP Toolkit to encapsulate their code in the Distributed Active Archive Center (DAAC) computing facilities. The purpose of the Toolkit is to provide an interface between instrument processing software and the production system environment. It sets up the context and environment to facilitate portability of code for the execution of production processes and the transfer of data sets and information to those processes. This interface will be implemented in the Science Computing Facility (SCF) development environment, along with additional utilities that will be used to emulate production environment services.

An important goal of the Toolkit is to facilitate the smooth transition and integration of code into the DAAC by abstracting out science process dependencies on external system architecture. Another goal is the provision of an interface into which application modules can be incorporated. This may include, for example, math packages; other specialized routines that can be commercial-off-the-shelf (COTS); freeware; or user supplied modules. An effort will be made during development to incorporate and reuse existing application software modules.

This Users Guide lays out the high level design of the Toolkit and provide sufficient description of routines to show how EOS science software should incorporate the Toolkit interface.

In the description of the Toolkit routines, descriptive information is presented in the following format:

**TOOL TITLE**

| | |
|---|---|
| **NAME:** | Procedure or routine name |
| **SYNOPSIS:** | |
| **C:** | C language call |
| **FORTRAN:** | FORTRAN77 or FORTRAN90 language call |
| **DESCRIPTION:** | Cursory description of routine usage |
| **INPUTS:** | List and description of data files and parameters input to the routine |
| **OUTPUTS:** | List and description of data files and parameters output from the routine |
| **RETURNS:** | List of returned parameters indicating success, failure, etc. |
| **EXAMPLES:** | Example usage of routine |

**NOTES:** Detailed information about usage and assumptions

**REQUIREMENTS:** Requirements from *PGS Toolkit Specification*, Oct. 93 which the routine satisfies

This SCF Toolkit version is directed at EOS instrument data providers who will deliver code to the ECS Release 5A DAACs. It is an engineering update to Toolkit 5.2.1, delivered in October. The user-calling interface of the current version is the same as Toolkit 5.2.1. The SCF Toolkit Users Guide describes Toolkit routine usage for science software developers, who will produce code to process instrument data. The current version of the Users Guide is for the Release 5A Toolkit delivered code, however, the Toolkit will be updated as requirements are updated, certified and requirements for later platform instruments are determined. This document describes the overall design of the Toolkit, provides a general explanation of usage, and installation procedures on computer platforms for which software development and certification have been done. Detailed listings of routines, calling sequences, inputs and outputs and examples of usage are also provided.

- **Release 5B SDP Toolkit Users Guide for the ECS Project [Document Number 333-CD-510]**

The SCF Toolkit Users Guide for the ECS Project (Contract Data Requirements List (CDRL) Item 069, Data Item Description (DID) 333/DV1) is a part of the Science Data Production (SDP) Toolkit delivery made under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It was first delivered in January 1994. The current Users Guide is updated for the Release 5B Toolkit delivery made in February 2000. The SCF Toolkit Users Guide for the ECS Project will be updated for each major release of the SDP Toolkit.

This document is aimed at the EOS data production software developers and scientists who will use the SDP Toolkit to encapsulate their code in the Distributed Active Archive Center (DAAC) computing facilities. The purpose of the Toolkit is to provide an interface between instrument processing software and the production system environment. It sets up the context and environment to facilitate portability of code for the execution of production processes and the transfer of data sets and information to those processes. This interface will be implemented in the Science Computing Facility (SCF) development environment, along with additional utilities that will be used to emulate production environment services.

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| **SYNOPSIS:** | |
| **C:** | C language call |
| **FORTRAN:** | FORTRAN77 or FORTRAN90 language call |
| **DESCRIPTION:** | Cursory description of routine usage |
| **INPUTS:** | List and description of data files and parameters input to the routine |
| **OUTPUTS:** | List and description of data files and parameters output from the routine |
| **RETURNS:** | List of returned parameters indicating success, failure, etc. |
| **EXAMPLES:** | Example usage of routine |
| **NOTES:** | Detailed information about usage and assumptions |
| **REQUIREMENTS:** | Requirements from *PGS Toolkit Specification*, Oct. 93 which the routine satisfies |

This SCF Toolkit version is directed at EOS instrument data providers who will deliver code to the ECS Release 5B DAACs. It is an engineering update to Toolkit 5.2.5, delivered in June. The user-calling interface of the current version is the same as Toolkit 5.2.5. The SCF Toolkit Users Guide describes Toolkit routine usage for science software developers, who will produce code to process instrument data. The current version of the Users Guide is for the Release 5B Toolkit delivered code, however, the Toolkit will be updated as requirements are updated, certified and requirements for later platform instruments are determined. This document describes the overall design of the Toolkit, provides a general explanation of usage, and installation procedures on computer platforms for which software development and certification have been done. Detailed listings of routines, calling sequences, inputs and outputs and examples of usage are also provided.

- **Release 6A SDP Toolkit User's Guide for the ECS Project [Document Number 333-CD-600]**

The SCF Toolkit Users Guide for the ECS Project (Contract Data Requirements List (CDRL) Item 069, Data Item Description (DID) 333/DV1) is a part of the Science Data Production (SDP) Toolkit delivery made under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It was first delivered in January 1994. The current Users Guide matches the Release 6A Toolkit delivery being made in November 2000. The SCF Toolkit Users Guide for the ECS Project will be updated for each major release of the SDP Toolkit.

This document is aimed at the EOS data production software developers and scientists who will use the SDP Toolkit to encapsulate their code in the distributed active archive center (DAAC) computing facilities. The purpose of the Toolkit is to provide an interface between instrument processing software and the production system environment. It sets up the context and environment to facilitate portability of code for the execution of production processes and the transfer of data sets and information to those processes. This interface will be implemented in the Science Computing Facility (SCF) development environment, along with additional utilities that will be used to emulate production environment services.

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This Users Guide lays out the high level design of the Toolkit and provide sufficient description of routines to show how EOS science software should incorporate the Toolkit interface.

In the description of the Toolkit routines, descriptive information is presented in the following format:

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| **DESCRIPTION:** | Cursory description of routine usage |
| **INPUTS:** | List and description of data files and parameters input to the routine |
| **OUTPUTS:** | List and description of data files and parameters output from the routine |
| **RETURNS:** | List of returned parameters indicating success, failure, etc. |
| **EXAMPLES:** | Example of usage of routine |
| **NOTES:** | Detailed information about usage and assumptions |
| **REQUIREMENTS:** | Requirements from *PGS Toolkit Specification*, Oct. 93 which the routine satisfies |

The SCF Toolkit version 5.2.7 is directed at EOS instrument data providers who will deliver code to the ECS Release 5B DAACs. It is an engineering update to Toolkit 5.2.6, delivered in February 2000. The user-calling interface of the current version is the same as Toolkit 5.2.6. The SCF Toolkit Users Guide describes Toolkit routine usage for science software developers, who will produce code to process instrument data. The current version of the Users Guide is for the

Release 6A Toolkit delivered code, however, the Toolkit will be updated as requirements are updated, certified and requirements for later platform instruments are determined. This document describes the overall design of the Toolkit, provides a general explanation of usage, and installation procedures on computer platforms for which software development and certification have been done. Detailed listings of routines, calling sequences, inputs and outputs and examples of usage are also provided.

- **Release 6A.07 SDP Toolkit Users Guide for the ECS Project [Document Number 333-CD-605]**

The Science Computing Facility (SCF) Toolkit Users Guide for the ECS Project (Contract Data Requirements List (CDRL) Item 069, Data Item Description (DID) 333/DV1) is a part of the Science Data Production (SDP) Toolkit delivery made under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It was first delivered in January 1994. The current Users Guide matches the Release 6A Toolkit delivery being made in November 2000. The SCF Toolkit Users Guide for the ECS Project will be updated for each major release of the SDP Toolkit.

This document is aimed at the EOS data production software developers and scientists who will use the SDP Toolkit to encapsulate their code in the distributed active archive center (DAAC) computing facilities. The purpose of the Toolkit is to provide an interface between instrument processing software and the production system environment. It sets up the context and environment to facilitate portability of code for the execution of production processes and the transfer of data sets and information to those processes. This interface will be implemented in the SCF development environment, along with additional utilities that will be used to emulate production environment services.

An important goal of the Toolkit is to facilitate the smooth transition and integration of code into the DAAC by abstracting out science process dependencies on external system architecture. Another goal is the provision of an interface into which application modules can be incorporated. This may include, for example, math packages; other specialized routines that can be commercial-off-the-shelf (COTS) software; freeware; or user supplied modules. An effort will be made during development to incorporate and reuse existing application software modules.

This Users Guide lays out the high level design of the Toolkit and provide sufficient description of routines to show how EOS science software should incorporate the Toolkit interface.

In the description of the Toolkit routines, descriptive information is presented in the following format:

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**SYNOPSIS:**

**C:** C language call

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**DESCRIPTION:** Cursory description of routine usage

**INPUTS:** List and description of data files and parameters input to the routine

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The SCF Toolkit version 5.2.7 is directed at EOS instrument data providers who will deliver code to the ECS Release 5B DAACs. It is an engineering update to Toolkit 5.2.6, delivered in February 2000. The user calling interface of the current version is the same as Toolkit 5.2.6. The SCF Toolkit Users Guide describes Toolkit routine usage for science software developers, who will produce code to process instrument data. The current version of the Users Guide is for the Release 6A Toolkit delivered code, however, the Toolkit will be updated as requirements are updated, certified and requirements for later platform instruments are determined. This document describes the overall design of the Toolkit, provides a general explanation of usage, and installation procedures on computer platforms for which software development and certification have been done. Detailed listings of routines, calling sequences, inputs and outputs and examples of usage are also provided.

## 6.2 System White Papers

White papers are non-deliverable documents provided to present approaches, work-arounds, studies and reports. These papers provided valuable information to accomplish project milestones, which otherwise would not have been met. The subject matter varies widely for these documents.

- **EMOS to ICC Planning and Scheduling File Formats and Detailed Activity Schedule Operational Timelines for the AM-1 Mission [Document Number 110-WP-001]**

The need for this white paper surfaced during an August 25, 1999 meting o redefine the tasks directed in Engineering Support Directive 78, ECS-EMOS/ECS-Science ICD for DAS. The meeting was attended by representatives of the Langley DAAC, ECS SDPS, ECS EMOS and ESDIS.

EMOS to ICC Planning and Scheduling file formats for the AM-1 mission are presently documented only in the ECS-ASTER ICD, but this information is also needed by MISR and potentially PM-1 instruments that wish to use the EMOS Filter Scheduler interface. The ECS-ASTER ICD should be modified by removing the DAS format information from Section5 and Appendix E and placing it in an independent ESDIS CCB-controlled Data Format Control Document (DFCB), which will be the universal reference for all IOTs and should not be duplicated in other documents. It is expected that the ECS-ASTER ICD, and documents for other instruments, will then only reference the DFCB.

At the ESD 78 meeting, it also became clear that more information than the formats is required in the DFCB: The IOTs need definitive operational time-line information concerning the planning and scheduling files to understand how to design and set their normal and emergency product generation operations procedures.

This white paper is written solely as the prototype of the planned DFCB. It presents the format and time-line information needed by DAAC and IOT personnel in a single document, providing the opportunity for them to review it at the earliest possible and to use it as a working document during resolution of operations issues until publication of the DFCB.

This white paper contains specifications for the ASTER and MISR instruments only. Other instruments may be included in the derivative DFCB at ESDIS direction.

An interface control document for DAS files ingesting and EMOS history files into the ECS archives will be prepared. That interface is not within the scope of this white paper.

- **End-To-End Test Plan for the ECS Project [Document Number 161-WP-001]**

The purpose of the End-to-End test is to verify performance criteria, which are outlined in feature tickets. The End-to-End test will be run at each site using Day-in-the-life scenarios. The scenarios will be used as the basis for validating system operations. Additionally, the purpose will be to prove that the system can work around problems, recover from failures and prove that the system is viable from an operations perspective.

This document describes the ECS End-to-End testing plan. The document will describe the purpose of the testing, the actual test scenarios, special tools needed, resources and criteria for success. This document also contains a high level schedule for when the testing activities will occur. ECS has been notified that this functionality is no longer required, however, since formal notification has not arrived prior to writing this document, details are still included.

- **Catalogue Interoperability Protocol (CIP) - Technical Note on Local Attributes [Document Number 170-WP-017]**

The CIP URD contains requirements for CIP B to support "local" attributes for a collection at the local site. The current CIP B Specification v 2.2 presents a method of handling "local" attributes by defining a new schema, which includes the CIP attributes in addition to the "local attributes." These schema are then described in the EXPLAIN database. Any query, which is directed at one of these "local" schemas can use the local attributes in addition to the CIP attribute set. The schema can be used by any number of "collections" so the attribute definitions can have a scope from one collection to the entire local site.

There have been issues with the approach described in the CIP Specification v2.2. The purpose of this TN is to identify the issues and alternative solutions for the CIP Specification Consolidation efforts.

- **ECS Evaluation Packages Strategic Plan EP7 Update [Document Number 420-TP-008]**

This white paper describes the plan and process for the delivery and evaluation of the ECS Evaluation Packages (EP). This is an update to the original document, MA9402V1 and its

subsequent version, 222-WP-003-001 (EP6 time frame). The objectives of this document are to 1) provide an overview of the EP process to set the context of planning, 2) define a projected plan for the content of each evaluation package delivery, and then 3) define the detailed process structure for development, test, installation, evaluation and maintenance of those deliveries.

- **Issues to Consider in a Federated Environment [Document Number 170-WP-009]**

In July 1995, the Board on Sustainable Development Committee on Global Change Research conducted a review of NASA's Mission to Planet Earth program, which includes the Earth Observing System Data and Information System (EOSDIS). While the EOSDIS review findings were in general favorable, the Committee recommended that NASA *reconfigure EOSDIS to transfer responsibility for product generation, publication and user services to a competitively selected federation of partners in government, academia and the private sector*. It was suggested that such a reconfiguration might accelerate system evolvability and help stimulate a wider range of participation from outside the EOS community.

This paper examines some of the issues that must be considered in providing data and services in a federated environment. It is intended to motivate discussion on what capabilities should be provided by competitively selected Earth Science Information Partners (ESIPs) and to what extent the ESIPs must cooperate together to meet the needs of federated users.

- **Catalogue Interoperability Protocol (CIP) Prototype Development Plan [Document Number 170-WP-013]**

The prototype development is driven by two primary objectives as defined in ESD #25. The first objective is to demonstrate the feasibility of the concept of a Catalogue Translator. The second objective is to prove the feasibility of a CIP (extended Z39.50) based ICS prototype (or CIP-Prototype) while reusing as many existing components as possible and conforming to HITS Software Engineering methods. This document defines the components that currently exist, although by no means does it limit the use of "newly found" software.

In this document, we will first define the priorities in the iterative development of the components that make up the complete CIP-Prototype. We will identify the component that will be built at various stages of the project. We will then show the integration plan for bringing together all the required components into a cohesive whole with supporting milestone and risks.

The lessons learned from the Prototype, including those learned through the development phase, will be incorporated into the CIP-Release C Specification, no make it more compatible.

- **Interoperable Catalog System (ICS) Gateway Prototype Design Document [Document Number 170-WP-015]**

The Interoperable Catalog System (ICS) Gateway is a proof-of-concept software system designed to provide interoperability between ECS and ICS domains for inventory search, inspect and browse requests. The prototype supports one way interoperability (i.e., ECS requesting ICS services and ICS responding to those requests).

This design document describes the design and functionality of the major components of the portotype.

- **Catalogue Interoperability Protocol (CIP) - Technical Note on Guide [Document Number 170-WP-016]**

The purpose of this paper is to present the recommended approach for incorporating Guide Data within the CIP framework. To accomplish this goal several alternatives are presented followed by a detailed explanation of the recommended alternative.

- **ICS Query Performance Estimation [Document Number 170-WP-014]**

The intent of this document is to describe the methods and assumptions that were used to develop query performance estimates. These estimates appear in Section 8 of the Committee on Earth Observation Satellites (CEOS) Interoperable Catalogue System (ICS) System Design Document (SDD).

The report assumes at least a passing knowledge of collections and the Catalogue Interoperability Protocol (CIP) on the part of the reader. As a consequence, it will not go into depth about the workings of CIP, the concepts behind collections or the Retrieval Managers. The level of detail presented will vary with the need to support an assumption, explain a view or develop a performance equation.

- **Operating System Upgrade Plan for SGI Machines in ECS [Document Number 223-WP-001]**

This document describes the plan for transitioning from SGI IRIX 6.2 to SGI IRIX 6.5. The plan addresses the process for transitioning and testing in the Landover environments (EDF, VATC and PVC) and at the DAACs.

- **Procedures for the Transition of ECS into the IRIX 6.5 Environment [Document Number 420-WP-013]**

The purpose of this document is guide to implement the transition of the ECS Operating System from the IRIX 6.2 to the IRIX 6.5 on the SGI system of hosts. This document provides machine movement plans, a generalized overview if the transition steps, advanced preparation details, OS and COTS installation procedures, a training plan using the VATC, Sybase transition steps, detailed procedures at each DAAC and rollback processes.

- **Final Report on CIP Prototype Study Engineering Support Directive 60 [Document Number 170-WP-022]**

This report describes the prototyping efforts covered under ESD 60. The objectives of this effort were to provide interoperability between the ICS domain and the ECS and IMS domains. Two task threads were chosen for demonstration purposes:

  - ICS Clients accessing ECS Services and
  - IMS Clients accessing ICS services

This document describes the design and implementation/configuration of the major components that constituted the above two tasks, as well as describing the lessons learned as a result of this effort. Possible follow-on tasks to this ESD are also described.

- **Data Assimilation System Integration with the ECS [Document Number 170-WP-005]**

The purpose of this White Paper is the following:

- Define the interface between the DAS and the ECS beyond the Release B implementation of the ECS
- Identify the ECS utilities and Toolkit that will considerably simplify the architectural design of the DAS
- Identify areas where ECS will need enhancements in order to support DAS
- Provide and end-to-end description of how ECS supports different modes of operations related to the DAS
- Document the design rationale for the areas where ECS interfaces with DAS
- Describe the deployment plan and schedule for getting DAS integrated with ECS in time for the AM-1 launch
- Present an operations concept for the DAS after deployment at the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC)
- Describe integration and testing methodology for getting science algorithms incorporated into DAS

The Data Assimilation Office (DAO) is responsible for developing advanced assimilation algorithms used to produce research-quality assimilated data products like the multi-year global atmospheric data sets. In the Operations mode of DAS, data from various sources (e.g., National Oceanic and Atmospheric Administration (NOAA)) are provided to the DAS. Some of the DAO acquired data sets are required by ECS as ancillary data for ECS production. This document will explain hoe the ECS, located at the GSFC DAAC, stages data needed by the DAS, archives data needed by DAS and distributes DAS generated products to the end-users. In addition, this document describes how the ECS at EROS Data Center (EDC) performs post-processing of Moderate-Resolution Imaging Spectrometer (MODIS) data (using software provided by the DAO) needed by DAS before being forwarded to the ECS at GSFC.

This document defines various aspects of the deployment of DAS related equipment that will be used installed at the GSFC DAAC. The document establishes the schedule of activities leading to the integration of DAS equipment at the GSFC DAAC. The operations concept defined in this paper supersedes the current operational concept for the DAS. This white paper is not a deliverable item as identified in the Contract Data Requirements List for the ECS project and therefore, does not have a Data Item Description (DID) associated with it. The ES architectural description included in this paper is for reference purpose only and in case of discrepancy, documents generated under DID 305 will supersede this white paper.

- **Validation Issues and Processes for V0 Data Migration [Document Number 170-WP-008]**

Selected Version 0 (V0) data products are migrated from their current formats to the Hierarchical Data Format - Earth Observing System (HDF-EOS) during the V0 Data Migration task. These data products are then ingested into the Earth Observing System Data and Information system (EOSDIS) Core System (ECS). Validation o the migrated data is critical to ensure the migration process accurately represents the original data. It is expected that DAAC scientists and other data specialists will be heavily involved in data validation.

The purpose of this white paper is to examine validation issues and processes related to V0 data migration and seek feedback from the V0 DAACs and science community. In particular, examination of various validation schemes must consider key drivers such as complexity, level of confidence and cost. Although we expect many of the methods discussed in this paper, at some level, will eventually be incorporated into V0 data migration, we stress we are not restricted to these methods.

- **ECS Capabilities Supporting a Federated System [Document Number 170-WP-010]**

In July 1995, the Board on Sustainable Development Committee on Global Change Research conducted a review of NASA's Mission to Planet Earth program. At the functional nucleus of MTPE is the Earth Observing System Data and Information System (EOSDIS). EOSDIS is a geographically distributed information system, which ingests, processes, stores and distributes the data acquired by EOS in-orbt payloads and U.S. observatories. While the EOSDIS review findings were in general favorable, the Committee recommended that NASA

> *Reconfigure EOSDIS to transfer responsibility for product generation*
>
> *Publication and user services to a competitively selected federation of*
>
> *Partners in government, academia and the private sector.*

The committee suggested that such a reconfiguration might accelerate overall system evolvability and help stimulate a wider range of participation from outside the EOS community.

This paper discusses the capabilities that various Earth Science Information Partners (ESIPs) may wish to provide in such a federation and also suggest the means to provide them.

- **Establishing Science Software Exit Conditions for the Production Environment [Document Number 420-WP-006]**

The purpose of this document is to address the need for providing a communication pathway from the science software to the ECS production system. Defining one that can be implemented in a Release A time frame and that can be expanded to accommodate future science software releases is also a goal of this white paper.

The mechanics of establishing this communication link are defined, along with a set of predefined messages that the science software can use to "talk" to the production system. To

convey science specific messages to the production system, a user customized template is provided.

This white paper derives its origin from PDR RID 423, which addressed the concern regarding various exception conditions and their effect on the system.

- **Operations Concept for Digital Elevation Model Data in ECS [Document Number 162-WP-003]**

The NASA Earth Observing System Data and Information System (EOSDIS) Core System (ECS) processes, archives and distributes science data taken from instruments on EOS-AM1, Landsat-7, EOS-PM1 and other spacecraft in the EOS program. The system is scheduled to be released to archive centers (DAACs) in March 1999. The system becomes operational by July 1999. DAAC locations include EROS Data center (EDC), Goddard Space Flight Center (GSFC), National Snow and Ice Data Center (NSIDC), Langley Research Center (LaRC) and others.

ECS has a requirement to supply storage for and access to Digital Elevation Model (DEM) data for instrument data processing and for access by authorized users. The format and content of the data has been specified by the DEM access committee of the Science Working Group, EOS-AM1 Platform (SWAMP). The committee specification was at a high level, giving the data resolution, coverage and data variables to be included.

Raw DEM data is produced by EDC for NASA. This data is the binary formatted representation the content specified by the SWAMP committee. The binary data is reformatted to HDF, the standard data format of ECS. The HDF data is then ingested and stored by ECS at the EDC archive center. ECS has the responsibility for the later two functions. It is expected that occasional updates will be made to the data throughout the lifetime of the EOS program.

The data will be accessed by instrument data processing software, using an interface provided by ECS and running at EDC and other DAACs. The data will also be accessed as standard ECS products by external users, who have been authorized by NASA.

This document gives an operations concept for ECS handling of the DEM data. We describe: 1) the input data format and content, 2) output data, 3) software to be used in data conversion, 4) the plan for testing the conversion, 5) the ingestion process into ECS, 6) storage mechanism, 7) access to the data for science data processing and 8) access to the data by external users.

- **HDF-EOS Interface Based on HDF5, Volume 1: Overview and Examples [162-WP-004]**

The *HDF-EOS User's Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document will serve as a user's guide for the HDF-EOS file access library developed for ECS. Upon reading this document, the reader should have a thorough understanding of each data model and corresponding programming interface provided as part of HDF-EOS. Specifically, this user's guide contains an overview of each data model, a complete function-by-function reference for each software interface and sample programs illustrating the basic features of each interface.

The reader should note that this paper does not discuss the HDF structures underlying HDF-EOS nor the specific conventions employed. For more information on HDF, its design philosophy and its logical and physical formats, the reader is referred to NCSA documentation listed in Section 2.2, Applicable Documents. For more information on the conventions employed by HDF-EOS, the reader is referred to the various design white papers listed in Section 2.2.

*Important Note:*

The FORTRAN-literate reader is cautioned that dimension ordering is row major in C (last dimension varying fastest), whereas FORTRAN uses column-major ordering (first dimension varying fastest). Therefore, FORTRAN Programmers should take care to use dimensions in the reverse order to that shown in the text of this document.. (FORTAN code examples are correct as written.)

This document is intended for use by anyone who wishes to write software to create or read EOS data products. Users of this document will likely include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

Note: This current document describes a prototype library based on HDF5. Official NASA support of this new data format is not yet at hand. This recognition is expected in early 2000. In the near term, an HDF-EOS interface for both HDF4 and HDF5 based files will be provided. The HDF4 based library is currently V2.5.

- **HDF-EOS Interface Based on HDF5, Volume 2: Function Reference Guide [162-WP-005]**

The *HDF-EOS Software Reference Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This software reference guide is intended for use by anyone who wishes to use the HDF-EOS library to create or read EOS data products. Users of this document will include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **ECS Browse Granule Description [Document Number 170-WP-004]**

The Earth Observing System Data and Information System (EOSDIS) will provide browse services to assist earth scientists seeking appropriate data for research and analysis. Most EOSDIS Standard Data products will have browse granules associated with the data granules making up that product. The basic browse service that the EOSDIS Core system (ECS) will provide is the retrieval of pre-computed images associated with science data granules that have been identified through an external search and order tool, such as the EOSDIS Data Gateway (EDG). Text and tables will also be supported as browse products. Normally, browse granules will be generated at the same time as the data granules they are associated with. However, browse granules may also be added to the system at a later time.

EOSDIS defines browse to be a *rapidly accessible, on-line aid to ordering* science data products. Browse is a service used in determining whether a data product is suitable for a given purpose. What we call a "Browse granule" is an HDF file containing images, text or tables used in making this determination.

One browse granule may serve as the browse product for multiple science data granules. A single cloud cover mask, for example, may serve as appropriate browse for all Level 1 and Level 2 data granules covering the same temporal and spatial domain. Also, a science data granule may have more than one browse granule associated with it. This allows data providers to supply browse granules tailored to different disciplines. However, since a browse granule may contain multiple images, it is recommended that all browse information for any given science granule be contained within a single browse granule. Also, the EDG at present can support only one browse granule per science granule.

Currently, the EDG is used to search science data granule inventories, select candidate granules for ordering and browse these candidate granules to determine if they are suitable for the analysis intended. The purpose of this document is to help data providers in producing browse granules that will be compatible with the browse services in the EDG and any future interfaces that may be created to access data in the ECS archives. This document contains specifications for the format, organization and syntax of a browse granule. The specific science content of browse granules is the responsibility of the science team associated with the science data product. The Earth Science Data and Information System project (ESDIS) has surveyed Distributed Active Archive Centers, EOS Instrument Teams and related earth observation projects to determine their requirements for browsing and browse data. The specifications defined in this document are intended to help ECS satisfy those needs.

- **An HDF-EOS and Data Formatting Primer for the ECS Project [Document Number 175-WP-001]**

The purpose of this document is twofold. The first is to introduce the Earth Observing System Data and Information System (EOSDIS) Version 1 (V1) community to the HDF file format that has been chosen as the EOSDIS Core System (ECS) Standard Data Format. Our intention is to provide enough background information so that EOS personnel that need to use HDF today can do so as easily as possible. Additional and more detailed information is provided in referenced user's guides.

The second purpose of this document is to discuss extensions to HDF, developed for the ECS program. These extensions are called HDF-EOS and are primarily used to provide project-wide standards for attaching geo-spatial and temporal information to science data. The format is also a container for inventory and product specific metadata, the information also stored in ECS databases and used for search and order functions.

- **Reliability, Maintainability and Availability (RMA) Analysis for the ECS Project [Document Number 245-WP-001]**

The purpose of this paper is to clarify, resolve and document concerns and issues involving RMA topics that are not satisfied, particularly those regarding the consideration of RMA analyses involving software related failures. It is also intended to document the process to be

used to collect and analyze the data to determine whether or not the system meets requirements for "sell off" of the system to the customer in a satisfactory manner.

- **Bulk Metadata and Browse Export Capability for the ECS Project [Document Number 170-WP-023]**

In order to support the development of value-added providers (e.g., IIMS, ESIPs, RESACs and InfoMarts), ECS sites will make an external representation of their metadata holdings available and provide a capability for bulk distribution of browse data through normal ECS distribution methods.

Several new ECS data collections will be created and maintained at each site to store this data. Bulk Metadata generator and Bulk Browse Generator Tools will be run daily at each site to populate these data collections. One metadata product will be created per ESDT group per day. Each product will contain an external representation of the metadata for each new, updated or deleted granule that is a member of the ESDT group. The format used for the external representation of the metadata is XML. One bulk browse product will be produced per day that contains references to all new, updated or deleted browse granules. Value-added providers may use any of the standard ECS search, order and subscription capabilities to find and order these bulk metadata and browse products.

This document defines the operations concept for the ECS Bulk Metadata and Browse Export Capability and specifies the XML Document Type Definitions (DTDs) for the external representation of the metadata.

- **Machine-to-Machine Search and Order Gateway Interface for the ECS Project [Document Number 230-WP-001]**

The ECS Project has contractual requirements to provide a machine-to-machine gateway to support external reprocessing of standard ECS products. This interface has been a TBD in Volume 0 of the ICD between ECS and the SIPS since that document was base-lined. This white paper summarizes the preliminary design of the machine-to-machine gateway interface, giving ESDIS and potential users a chance to review and understand the operations concept and high-level design.

This is the last revision of this white paper. The content of the paper will be folded into a volume of the ICD between ECS and the SIPS for CCB approval.

- **Proxy Agent Requirements for COTS Software Manageability [Document Number 420-WP-009]**

The document's purpose is to specify the minimum requirements for developing a COTS software proxy agent; a proxy agent is a software component (event handlers like Tivoli, ESSM, or custom developed code) acting as an interface between a COTS software product and a system management component. The COTS software proxy agent is to pass information collected from COTS software components to the appropriate management logs and to respond to certain management operations. The COTS software that a subsystem is responsible for is identified in Section 2.

- **Production History and Processing Log Definition and Usage [Document 420-WP-010]**

The purpose of this document is to provide a consistent definition of the Processing Log across the Client, Data Server, and Processing subsystems; each subsystem's interactions with the Processing Log (i.e., the capability to insert and retrieve them); and the capability to search for granules using Production History.

The terms "Production History" and "Processing Log" are not synonymous. The two terms are clarified for the purposes of this paper.

A granules **production history** is composed of two components 1) searchable granule and collection level metadata attributes and 2) attributes stored in the Processing Log file. The "Production History" is represented as: the granule metadata lineage links to granules to produce a particular granule; the granule metadata PGE version; the collection metadata PGE name; the granule metadata link to processing log; and the processing log.

The **processing log** is subset of production history that comprises of a flat file attached to each granule. Therefore, there is not a file that is refereed to as "production history log," instead there is a file called "processing log."

This white paper is intended to address the ESDIS' concern on the capability to search and retrieve "production history logs" by identifying the data being captured and stored and by presenting a change to the data model which when combined with existing metadata defines "Production History." This does not fully answer SDPS Issue # 49 but only a portion.

- **QA Metadata Update Tool for the ECS Project [Document Number 160-WP-002]**

This paper describes the capabilities and design of the Quality Assurance (QA) Metadata Update Tool (QAMUT). The QA Metadata Update Tool's purpose is to enable both Science Computing Facility (SCF) and Distributed Active Archive Center (DAAC) QA experts to modify values of their respective quality flags (i.e., ScienceQualityFlag and OperationalQualityFlag) on core metadata for multiple granules at a time in a batch mode. To support this functionality, the tool must:

  - Restrict update privileges to only authorized users
  - Accept a list of multiple granules to update (batch update)
  - Ensure that metadata updates are performed using valid values
  - Maintain a log of metadata changes and the source of the changes

These capabilities, when combined with DAAC and SCF operational procedures, will enable authorized users to quickly and easily modify the QA metadata for which they are responsible while maintaining a system of checks and balances to reduce the risk of malicious or accidental corruption of EOSDIS products.

This paper describes the ECS provided QA functionality, QA update scenario, functional and operational capabilities of the tool (version 1.0), and some design issues to be resolved.

- **A Review of EOSDIS QA Metadata: Support for EOS Quality Assessment (QA) and QA Metadata Update Tools [Document Number 160-WP-003]**

This paper discusses the ECS metadata attributes designed to support QA functions, and tools and functionality that have been developed by ECS for the science teams and the DAACs to perform their manual QA analyses and enter their QA results into the QA Metadata.

- **Mission Statement for TRMM Release for the ECS Project [Document Number 420-WP-003]**

This white paper discusses the ECS TRMM Release System to be deployed December 1996 at four of the Distributed Active Archive Centers (DAACs) - GSFC, EDC, MSFC and LaRC.

- **SMC Unattended Operations Scenarios for the ECS Project [Document Number 420-WP-011]**

This white paper presents an operations concept by way of operations scenarios for unattended operations support provided by the System Monitoring Center (SMC). This paper responds to the recommendations presented in the RID issued at the Release B CDR, RID 86, unattended operations. The scenarios presented are meant to be representative of what the current design of the ECS is capable of supporting for unattended operations. All of the scenarios are based on the concept of monitoring managed objects and remotely logging into a DAAC for corrective action. These scenarios are intended to be included in the update of Release B SDPS/CSMS Operations Scenarios for the ECS Project document, 605-CD-002-001, prior to Release B's RRR in 1997. Therefore, they follow the document's form and format.

- **Turnover Plan for the ECS Project [Document Number 620-WP-001]**

This white paper describes the ECS Project's implementation of the ECS Statement of Work (SOW) and the ECS Product Assurance Requirements (PAR) requirements for the post-CDR activities and reviews leading to turnover of the EOSDIS Core System (ECS) to NASA. The post-CDR activities described herein include the product development, integration, test, operational site delivery and on-site acceptance test activities and the Readiness Reviews associated with those activities. The readiness reviews provide ECS project management, ESDIS and the Earth science community insight into the details of the post-CDR delivery and turnover process.

The ECS Project's turnover activities also have been described in a number of Contract Data Requirements List (CDRL) documents that have been delivered as the development of the ECS evolved. This white paper consolidates the ECS Project's current understanding of the turnover process, into a single reference document for the convenience of all participants in the ECS turnover process. It describes a generic framework of activities and reviews for release and turnover of ECS products that can be tailored for all ECS Releases.

- **Plan for Physical Configuration Audits of EOSDIS Core System, ECS Version 2 Commercial Off-the-Shelf Hardware [Document Number 151-WP-002]**

This plan sets forth the procedures by which the Earth Observation System Core System (ECS) Version 2 hardware configurations will be formally audited and conveyed to ECS site personnel.

Audits will examine all ECS Version 2 hardware to assure it conforms to the product baseline established for the Release. The audits will be conducted by an ECS audit Team composed of representatives of all ECS organizations and government personnel.

Audits will be conducted in accordance with the ECS Project Instruction CM-1-009, Configuration Audits.

- **Reuse Report for the ECS Project [Document Number 711-WP-001]**

This study of reuse for the ECS Project seeks to move the ECS project toward a component-based development paradigm for a downstream evolutionary change era. Releases C and D or equivalent time-span would represent this era where ECS components would be included in end-user systems. The study explores how the reuse can be explored to increase the capacity to make evolutionary changes on the current system so that improved user satisfaction can be realized in this downstream era. While there has been no specific effort toward reevaluating present architectural concepts, it is unavoidable that reuse must take into account general information system movement toward more open, loosely coupled structuring. Some of the processes developed and used in the study have undergone experimentation in actual project groups and with actual project artifacts assessing, in some cases quantitatively, the effect of the approach on the group's activities and resources.

- **Catalog Interoperability Protocol Catalog Translator Design Document for the ECS Project [Document Number 170-WP-018]**

The Catalog Interoperability Protocol/EOSDIS Core System Catalog Translator Prototype is a proof-of-concept software system designed to provide translation of services between ICS and ECS domains for directory queries (catalog searches), inventory queries, search requests and browse requests. The Translator prototype translates the ICS requests to ECS services and converts the ECS responses to ICS responses. The functionality allows the users in the ICS domain to interrogate ECS without specific ECS knowledge.

This design document describes the design and functionality of the Catalog Translator.

- **Earth Science Query Language Overview and Release B Design Impact Assessment [Document Number 440-WP-020]**

This paper addresses

  - The use of an Earth Science Query Language as a means for users and applications to access ECS services
  - The description of a set of queries that can be used to design the query language interfaces among the Release B subsystems
  - The impact of the proposed ESQL baseline (Illustra SQL subset) on the Release B design, including primarily the Client, Data Management, and Science Data Server Subsystems

The constraints on the study of query languages included:

- Selection of Illustra and its associated extended SQL query language as the DBMS and baseline query language for ECS Release B
- Science user and NASA customer expectations as evidenced in the ECS Level III requirements and design working groups
- The ECS Science User Matrix

The emphasis in this version of the white paper is on the query language and the design threads that define the services, data types, parameters, sensors, sequence of operations and data formats/types that pass between ECS clients and servers.

- **HP-To-Sun migration Plan [Document Number 840-WP-001]**

The purpose of this document is to describe the approach for migrating all remaining ECS software products and custom code currently base-lined against HP machines at the sites to a Sun platform.

## 6.3 System Technical Papers

- **Data Migration Service (DMS) Development Plan for the ECS Project [Document Number 160-TP-011]**

This document describes the plan for development of the Configuration Items (CIs) and interfaces of the Data Migration Service (DMS) of the ECS. The plan identifies technical development factors required to implement the DMS, including issues related to the selection of the DMS architecture, internal/external interfaces and dependencies on COTS/ECS software packages. In addition, this document establishes the DMS functional requirements to clarify the presentation of the overall DMS system. The Development Plan is consistent with schedules and other technical efforts (e.g., Global DAAC inventory) related to the data migration effort.

Note: This document does not provide an overview of the development environment, configuration management and the Project Instructions that are applicable to the DMS streamlined development approach. These topics are covered in the DMS Software Development Plan, Document 160-TP-TBD-TBD.

- **Treatment of Metadata within the EOSDIS Core System Architecture [Document Number 221-TP-005]**

NASA's Earth Observing System (EOS) Core System will be the cornerstone of a new era of multi-disciplinary research to study the processes leading to global climate change. The EOS series of remote-sensing satellites will scan the earth for several years transmitting hundreds of gigabytes of valuable data every day by the middle of 1999. The giga-flop level of processing and data product generation will require archives to store terabytes of data daily. Over the lifetime of the EOS, the archives will store petabytes, $10^{15}$ bytes of data.

The EOS Data and Information System (EOSDIS) will provide the computing and network facilities to support the EOS community's research activities. EOSDIS will be an integrated system that supports multiple satellites and instruments, including instruments to be launched by NASA, the European Space Agency (ESA) and the Japanese National Space Agency (NASDA). The system will provide end-to-end-services from command and control of spacecraft instrumentation, to data collection and processing, to full access of EOS and other data holdings.

The EOSDIS Core System (ECS), the EOSDIS' infrastructure, will provide scientists a broad range of desktop services for data search and access. According to current plans, the data from each EOS instrument will be sent to one of several designated data centers, known as Distributed Active Archive Centers (DAAC), responsible for processing, archiving and distributing EOS and related data. NASA selects DAACs based on their expertise in specific science disciplines and demonstrated long-term commitments to the corresponding user communities. These data centers will house the ECS computing facilities and operational staff needed to produce EOS standard Products and to manage, store and distribute EOSDIS data and associated metadata. The DAACs will exchange data via dedicated EOSDIS networks to support processing at one DAAC or Science Computing Facility (SCF) requiring data from another DAAC or SCF. With an evolving system, associated DAACs will be added to provide discipline specific key functionality.

- **Release Plan Content Description for the ECS Project [Document Number 222-TP-003]**

The purpose of this paper is to provide a plan for delivery of the functional capabilities and services to the operational facilities that are contained in the EOSDIS Core System. This paper includes the functional capabilities and services required to support Change Order #1. This paper was developed by members of the Release Planning Working Group, which consists of representatives from the SIP, SDPS, CSMS, FOS, Project Control, Configuration Management, Quality Assurance and M&O organizations.

- **EP6 User Advisory Information [Document Number 430-TD-001]**

This advisory document is targeted towards the users of EP6. It contains a description of known problems and their work-arounds and a list of the deferred severity 5 Non-Conformance Report that were formally closed to documentation.

- **Evaluation Package 6 deployment Description [Document Number 222-TP-012]**

This technical paper provides a description of the several portions of Evaluation Package 6 (EP6) as approved for the ECS for deployment for user evaluation. EP6 will be installed on ECS DAAC Liaison Workstations, two servers within ECS EDF and on several EOS Science Advisors Workstations. EP6 user evaluation is presently planned to occur in November 1995 through January 1996.

Summary descriptions for each section of this white paper are provided in Section 3-1.

This technical paper specifies the contents of the ECS EP6. EP6 is composed of EP6 client on both Sun and HP platforms and EP6 application servers.

- **Systems Performance Models for the ECS Project [Document Number 241-TP-001]**

The purpose of this paper is to provide a description of the ECS System Performance models.

The Systems Performance Models are intended to represent only the highest levels of the ECS. Models of individual subsystems and other more detailed models may be developed as the need arises. Those models are not documented here.

- **ODL Restrictions, ECS Specific and ODL Library Specific [Document Number 420-TD-069]**

This Technical Note specifies the known restrictions to the PDS ODL Standard 3.2 (http://pds.jpl.nasa.gov/stdref/stdref.htm Chapter 12) imposed by the Ecs implementation of those standards. These restrictions arise from both the specific share parser implementation restrictions (ECS has integrated the parser available through the above link), as well as restrictions imposed by the ECS implementation itself.

As such, this note should be viewed as an addendum to the PDS standard for all ECS data providers and users of ECS public Application Program Interfaces.

- **EP6 Evaluation Plan [Document Number 160-TP-007]**

This paper describes the two evaluation methods that will be used to evaluate Evaluation Package 6 (EP6): usability testing and user survey. Descriptions for the implementation of usability tests for EP6 and the on-line user survey, known as the Comment Survey Tool (CST), are provided. The data analysis schedule for these two data collection methods is given. In addition, a brief discussion and outline of the two types of EP6 Demonstration Scripts is provided.

- **Science-User Scripts for Exercising EP6 Functionality [Document Number 160-TP-008]**

This paper describes background material on Evaluation Package 6 (EP6), EP6 Help information and scripts that science users can use to exercise the functionality of Evaluation Package 6 across the following areas:

User Registration
Desktop/Workbench
Earth Science Search Tool (ESST)
Linkage between the ESST and the Advertising Service
Advertising Service
Data Dictionary
User Profile Tool
Trouble Ticketing Tool
EOSView
User Preference Tool
Comment Survey Tool

The information in the scripts is presented in an Action and Response format. Action the user should take is followed by the system response to that action.

- **Evaluation Package 6 (EP6) Results Report [Document Number 160-TP-010]**

The purpose of this paper is to present the results of the EP6 evaluation so that the information can be incorporated into the ECS design.

- **Prototype Workshop 2 (PW2) Results Report [Document Number 167-TP-001]**

This paper describes the results of the Prototype Workshop 2. At the Workshop four client search tools were presented for evaluation by NASA Tirekickers. Tirekickers provided comments and suggestions to improve each of the interfaces. These comments have been summarized and presented within this paper. In addition, the complete list of comments and suggestions will be given to the developers of each interface. The User Recommendations Data Base analysts will also review the complete list to determine whether the comments contain any potential new requirements.

- **EP7 Evaluation Plan [Document Number 160-TP-012]**

This paper describes the two evaluation methods that will be used to evaluate Evaluation Package 7 (EP7): usability testing and user survey. Descriptions for the implementation of usability tests for EP7 and the on-line user survey, known as the Comment Survey Tool (CST), are provided. The data analysis schedule for these two data collection methods is given.

- **Evaluation Package 7 (EP7) Results Report for the ECS Project [Document Number 167-TP-002]**

The purpose of this paper is to present the results of the Evaluation Package 7 (EP7) evaluation so that the feedback can be incorporated into the ECS design.

- **Science Software I&T Operational Procedures for the ECS Project (aka, the Green Book) [Document Number 162-TD-001]**

The purpose of this Technical Data Paper (also referred to as the "Green Book") is to delineate the operational procedures to accomplish the various steps that may be involved in the integration and test of Science Data Production Software (SDPS/W) with the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS). The SDPS/W integration and test (SSI&T) is performed at the Distributed Active Archive Centers (DAACs) responsible for the generation of the standard products.

General information concerning preparing and delivering SDPS/W to the DAAC is found in the *Science User's Guide and Operations Procedures Handbook for the ECS Project, Part 4: Software Developer's Guide to Preparation, delivery, Integration and Test with ECS (*205-CD-002-006*)*. Each DAAC and Instrument Team (IT) combination has formulated specific agreements, understandings or procedures that will guide their respective SSI&T activities. The procedures in this document provide detailed instructions on how to use the tools in the Release B of ECS to accomplish the steps outlined in the DAAC-IT procedures.

- **Analysis and Recommendations for the GUI Integration of COTS Software with ECS [Document Number 410-TP-003]**

The design of the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) incorporates a number of commercial-off-the-shelf (COTS) or other off-the-shelf (OTS) software products as well as custom-developed software. The *ECS User Interface Style Guide* provides guidance for the development of graphical user interfaces (GUIs) with a consistent 'look and feel' for ECS software. However, the incorporation of COTS/OTS products raises the concern that variation in styles of ECS GUIs may lead to increased probability of operator/user performance error or at the very least become a source of reduced productivity in system operation and use. This potential concern is further compounded by the presence of HyperText Mark-Up Language (HTML) in ECS applications. The challenge facing ECS developers is to design and tailor custom-developed, COTS/OTS and HTML GUIs to produce an effective integration of ECS software.

To address this challenge, the study reported here initiated a three-step analysis to address the integration of ECS software GUIs. The first step was to identify the variety of interfaces likely to be encountered by operators/users of ECS applications. The second step was to assess the human factors aspects of COTS GUIs, with a focus on operator/user roles likely to face significant variation in GUI environments/styles. The final step is to identify cost-effective interventions that can have the maximum effect to reduce the impact of that variation.

The three-step effort reported here provides a basis for interventions to facilitate the integration of COTS software products into ECS and achieve a common look and feel across ECS interfaces and thereby help improve the overall usability and acceptability of the system. The first step is an analysis to determine what software products, including COTS/OTS, custom Motif-based and custom HTML-based applications will be used in various job functions in the range of ECS operations, maintenance and use. This analysis enables identification of job functions that may be affected by potential differences between products in the GUI paradigms/metaphors used.

The second step is a human factors assessment of the usability of selected COTS products identified in the first step as applications used in large numbers of ECS job functions. The focus of the assessment is on the product GUIs, to determine the degree to which they comply or can be effectively made to comply with the *ECS User Interface Style Guide* and NASA requirements. The COTS products initially reviewed for this assessment included: *Autosys/Xpert, HP OpenView, Remedy, SYBASE and Z-mail*. A sixth COTS product, *Tivoli*, was examined in response to review comments.

The third step is recommendations for interventions to reduce the likelihood of performance errors or decreased productivity induced by the variety of GUI environments with which operators/users must contend. For example, we tailor those COST/OTS products found to deviate from the style specified in the *ECS User Interface Style Guide* to bring them as nearly as possible into compliance. The interventions are recommended in view of cost considerations and thus include primarily tailoring them through use of their internal capabilities for adjustment (e.g., user preference settings), training or other response to the human engineering comments identified in the second step of the effort.

- **HDF-EOS Data Format Converter Users Guide [Document Number 170-TP-013]**

The HDF-EOS Data Format Converter User Guide was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document will provide a user with a description of the functionality implemented by the GeoTIFF (HEG) software. The document describes usage of the software by both Graphical User Interface and command line interfaces.

This document is a user's guide for the HDF-EOS to HEG software.

- **Terra Spacecraft Ephemeris and Attitude Data Processing [Document Number 184-TP-001]**

DPREP is the generic name for a product generation executable that converts spacecraft ephemeris and attitude data to standard form for use by the EOSDIS Science Data Processing (SDP) Toolkit. DPREP has a standard set of functionality requirements that must be met , regardless of the platform(i.e., Terra).

Generally DPREP provides the means for transforming a wide variety of raw ephemeris and attitude formats from various spacecraft to a standard format for use by the SDP Toolkit EPH tools. This implies that DPREP has to be tailored or even partly rewritten for new spacecraft as they are added to the program. Thus far, DPREP software has been written for TRMM (now operational) and Terra (to be launched in 1999).

DPREP produces three data streams, one for ephemeris and in parallel, two for attitude data, from two different sources (see Section 1.2 and Figure 1-1). The ephemeris and attitude data sets are produced in two formats, Toolkit and HDF Format. A Toolkit formatted data set conforms to the internal format defined for use by the Toolkit EPH tools, namely PGS_EPH_EphemAttit. The HDF format data sets allow, in principle, transport of ephemeris and attitude data between hardware platforms.

- **The Transition Approach to the ECS Drop 5A System [Document Number 420-TP-019]**

This paper is intended to describe the problem of the transition from Drop 4Px to Drop 5A of the Release 2.0 baseline of the ECS. It is a higher level document that is intended to define the scope and general strategies for transitioning. It is intended to identify the work that needs to be done to successfully complete the transition. Issues that are identified as a result of this work will be tracked as resolved as the transition planning process continues. The Transition Plan will be prepared subsequent to the release of this document and will define the details of that work. In its final release, the Transition Plan will include references to the procedures that will be followed in the completion of the transition.

This paper is intended to define the activities needed to change the ECS at each of the DAACs from one configuration or baseline to another one. Each baseline, before or after the transition, is expected to have defined and prepared operations documents, training materials and plans, procedure manuals, etc. This paper will not describe that material or provide references to it. Rather, the focus of this paper is limited to the actual transition activities as opposed to the state of affairs before and after the transition.

- **Year 2000 ECS External Interfaces Audit Report [Document Number 212-TP-001]**

This Technical Paper describes the activities of the audit of ECS external interfaces for potential Year 2000 problems. This audit was identified in the "Year 2000 Plan for the ECS project," October 1997. It is being performed in lieu of the ECS Technical Direction Number 28, Year 2000 Requirements directive that states "ECS shall include the Y2K requirements in all external interfaces, as appropriate." As stated in the Year 2000 Plan, under the assumption that ECS External Interfaces are already thought to be Y2K compliant and after considering the resource that would be required to coordinate and update each of approximately 30 ECS IRD documents, the ECS Chief Engineer and the ECS COTR (Curt Schroeder) verbally agreed that instead of generating external interface requirements an audit of these interfaces was more appropriate at this time.

To maintain a high level of independence in this audit, it was not performed by the Interface Engineering group of ECS System Engineering who generated the ICDs.

- **External Data Provider Options [Document Number 442-TP-001]**

NASA's Earth Observing System (EOS) is a long-term, multi-disciplinary research mission to study the processes leading to global change and to develop the capability to predict the future evolution of the Earth System on time scales of decades to centuries. The EOS Data and Information System (EOSDIS) provides computing and network facilities to support the EOS research activities, including data interpretation and modeling; processing, distribution and archiving or EOS data; and command and control of the spacecraft and instruments.

Although EOSDIS will eventually contain an enormous amount of valuable Earth science data, there are other sources of information that are essential to the study of climate change. Of critical importance are holdings of other Global Change agency organizations, such as NOAA and USGS and other international organizations. The Global Change Data Management Working Group (GCDMWG) is currently in the process of defining the Global Change Data and Information System (GCDIS) intended to provide linkages between data services through a common set of interoperability services. In the international arena, the Committee on Earth Observation Satellites (CEOS) is developing a Catalog Interoperability Protocol (CIP) designed to support interoperability of data systems. NASA is actively participating in these efforts.

In addition, there is also a growing interest by earth scientists in the possibility of developing information systems for earth science data, which not only encompass the major data repositories but also enable users to take an active part in the information system, by providing data/services to the system. This approach, referred to as a User Data and Information System (UserDIS), seeks to encourage the scientific return from the investment in data and information systems by ensuring that the scientists are an integral part of the system.

Although NASA does not have the responsibility for developing either GCDIS or USerDIS, it wants to make sure that its development of the EOSDIS Core System (ECS) can support both of these evolutionary paths. This implies taking an architectural direction, which opens ECS so that it can be included within wider data systems and identifying architectural components, which ECS might contribute to these systems.

The purpose of this document is to describe how the ECS Release B design can enable interoperability with external data providers that are part of the broader GCDIS or UserDIS community. It summarizes the results of the External data provider Design Issue Team that was chartered to examine and purpose changes to the ECS Design to better support these types of data providers.

The scope of the document is limited to a discussion of ECS interfaces and components that can be reused to enable external data providers to make data and services available to the EOSDIS community (and vice versa). It does not focus on ECS interfaces and components that might be reused to support the ingest and processing of data products.

- **Data Acquisition Request Prototype Results [Document Number 430-TP-009]**

This white (technical?) documents the results of the Data Acquisition Request (DAR) Prototype. The document is intended to provide a single point of reference for information generated in the course of developing of the prototype. This document can be used to understand the engineering details of the DAR prototype and as a resource for further development of DAR functionality. The document focus is on the Phase 2 DAR prototype, which was a following-on to the Phase 1 DAR prototyping efforts.

- **The Role of Metadata in EOSDIS [Document Number 160-TP-013]**

This technical paper was written in preparation for the April 1997 EOSDIS Pre-Launch Metadata Workshop sponsored by NASA. A recurring theme from users about the design of the Earth Observing System (EOS) Data and Information System (EOSDIS) is that available documents describing Earth science data modeling have too many acronyms, heavy engineering emphasis and few summaries suitable for end users. This paper is intended to provide an easy-to-read summary of the process used to model Earth science data in EOSDIS including the use of descriptive data (i.e., metadata) to provide expanded services to end users.

- **Leveraging Nominal Orbit Spatial Extent to Provide a Solution for the Archival of Geoscience Laser Altimeter System (GLAS) Products in ECS [Document Number 160-TP-014]**

Generally speaking, the archival of products within ECS occurs in a manner that is independent of the type of product. Such independence is made possible by the strict inclusion of core metadata within each product instance or granule to use ECS parlance. Elements defined within this metadata provide the essential temporal and spatial components that ensure future retrieval of these archived products.

However, for performance and implementation related reasons, several constraints have been placed on the allowable spatial extent that can be defined for certain granules entering the archive. From early concepts of metadata and product requirements for the Geoscience Laser Altimeter System (GLAS) instrument, these restrictions would at first appear to disqualify GLAS products as potential ECS archive granules. But, as we have all come to learn, the general solution is not always the correct solution.

Indeed this is the case for the archival of Multi-angle Imaging Spectro-Radiometer (MISR) instrument products. Late in the development of ECS, it was learned that the above mentioned restrictions would be exceeded by MISR. To accommodate this special case, a unique solution to the problem of archival was devised. Formally labeled Nominal Orbit Spatial Extent, or NOSE, this solution provides the efficient archival and retrieval of MISR products without imposing an unreasonable resource load on the instrument development team. As with other ECS archival methods, the integrity of product search and order is maintained by the NOSE method.

In our quest to determine if the NOSE methodology is an appropriate one to use for the GLAS products, an analysis of the available archival and search requirements for those products must be conducted first. By then presenting the results of this preliminary analysis within the context of the NOSE implementation and drawing on comparisons with the MISR case, we can determine if NOSE is a suitable solution for GLAS product archival.

As with most solutions, rarely is there a perfect fit; the NOSE method is no exception. Therefore, those GLAS issues that fall outside the scope of the NOSE implementation have been captured for subsequent resolution, but are not addressed in this paper. The degree to which GLAS product archiving is satisfied by the NOSE method may be influenced by these other factors.

- **Pre-Processing of NMC GRIB Formatted Products [Document Number 170-TP-001]**

The purpose of this paper is to provide a baseline for the design of the GRIB format pre-processing component of the INGEST subsystem. This is part of the Ingest subsystem being developed as part of the ECS Project. It additionally documents the assumptions made during the design and highlights issues related to the work. Much of this document will be incorporated into the Ingest Subsystem detailed Design contained in DID-305, September 1996.

The basic requirement in the pre-processing work discussed in this paper is to reformat data in native GRIB format into a form suitable for use by a number of science groups. The proposed format for storing data within the ECS is the HDF-EOS format and it is proposed that this be maintained as the standard for this work. It should be noted that similar work has been undertaken by the SeaDAS group at GSFC, this current effort extending the functionality of this previous code within the confines of HDF-EOS and other relevant ECS documentation. Additionally, code to unpack NMC GRIB formatted data into binary files is provided at the NMC. For the most part, this code is written in FORTRAN. It is used extensively in the SeaDAS work and its reuse is proposed for this code in this work. Which pieces of code are used is dealt with in Section 3 of this paper, detailing the object model. The NMC unpacking code is freely available and it has been found that the subroutines can be used directly with no changes to the source code.

- **Methodology for Estimating DAAC-to-DAAC Traffic Due to User Pull [Document Number 164-TP-001]**

The purpose of this document is to describe the methods used by the ECS User Characterization Team to estimate the volume of DAAC-to-DAAC traffic resulting from user queries. This data is provided to ECS developers to support the design of the DAAC-to-DAAC communications network.

- **Pre-Processing of NESDIS and TOMS Ancillary Data Sets [Document Number 170-TP-002]**

The purpose of this technical paper is to present the object model and functional model for the pre-processing of NESDIS data in EDR MaterMap format. It also includes a discussion on the need for the pre-processing of NESDSI and TOMS data. This document's origin is based on discussions with Data Engineering and on the need to clarify the pre-processing requirements. Inputs are based on discussion with Data Engineering, Science Office (regarding TOMS data) and INGEST (object and functional model).

The object model will be incorporated into the Ingest Subsystem Detailed Design contained in DID-305 release (September 1996).

During the proposal for the contract extension under which this work is performed, an extensive survey of the science community was carried out, which proposed that pre-processing of common ancillary data products would be beneficial. Three common data sets were identified; NMC GRIB, NESDIS Snow/Ice products and TOMS products. The pre-processing of NMC GRIB is already dealt with and documented in the technical paper 170-TP-001-001. This document deals solely with TOMS and NESDIS Snow/Ice products.

This document will also describe the data model for the pre-processed data. Note that the data will be stored in both native and HDF-EOS format.

- **Writing HDF-EOS Grid Products for Optimum Subsetting Services [Document Number 170-TP-007]**

Given the self-describing nature of HDF-EOS, there are a vast number of ways in which data could be organized within a file. Having many different data organization approaches across the EOS data sets will lead to inefficiencies in developing common data type services, like subsetting, that are sensitive to data organization. In order to facilitate the development of subsetting services, this document provides a set of guidelines for writing HDF-EOS formatted grid files which will require these services.

- **Writing HDF-EOS Point Products for Optimum Subsetting Services [Document Number 170-TP-008]**

Given the self-describing nature of HDF-EOS, there are a vast number of ways in which data could be organized within a file. Having many different data organization approaches across the EOS data sets will lead to inefficiencies in developing common data type services, like subsetting, that are sensitive to data organization. In order to facilitate the development of subsetting services, this document provides a set of guidelines for writing HDF-EOS formatted grid files which will require these services.

- **Writing HDF-EOS Swath Products for Optimum Subsetting Services [Document Number 170-TP-009]**

This paper is based on the need to provide guidance on writing HDF-EOS formatted swath files, which will require subsetting services. Given the self-describing nature of HDF-EOS, there are a vast number of ways in which data could be organized within a file. This document gives the

preferred method to organize swath data sets to allow for subsetting. It is only for guidance and users do not have to follow the recommendations contained within this document. However, should subsetting be required for data with a different organization, ECS will require more detailed information on the file layout and additional custom code will need to be written..

- **Database Indexing Strategies [Document Number 420-TP-018]**

A major aspect of database tuning is reducing contention for system resources. As the number of users increase, applications contend for resources such as the data and procedure caches, spinlocks on system resources and the CPU or CPUs. The probability of lock contention on data pages also increases. Indexing is a major means of tuning the databases in the ECS. This primer identifies different indexing strategies as well as providing guidelines on how to choose the most appropriate index for a particular design.

- **A Data Formatting Toolkit for Extended Data Providers to NASA's Earth Observing System Data and Information System (V4.0) [Document Number 170-TP-012]**

This toolkit Users Guide is an extraction of and an extension to the SDP Toolkit Users Guide fo the ECS delivered under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000. The current SDP Toolkit Users Guide is updated for the Release 6A Toolkit delivery made in November 2000. Subsequent versions will accompany major ECS releases. This Toolkit Users Guide will be updated in conjunction with the SDP Toolkit Users Guide.

This document describes in detail the installation and usage of metadata access and time conversion tools. A user will be provided with detailed calling sequences and examples of usage of all the routines described in this document. Descriptions of error handling and external file access are also provided. Instructions for access to the software and electronic versions of this document will be provided.

In the description of the Toolkit routines, descriptive information is presented in the following format:

**TOOL TITLE**

| | |
|---|---|
| **NAME:** | Procedures |
| **SYNOPSIS:** | |
| **C:** | C language call |
| **FORTRAN:** | FORTRAN 77 or FORTRAN 90 language call |
| **DESCRIPTION:** | Cursory description of routine usage |
| **INPUTS:** | List and description of data files and parameters input to routine |
| **OUPUTS:** | List and description of data files and parameters output from the routine |
| **RETURNS:** | List of returned parameters indicating success, failure, etc. |

**EXAMPLES:** Example usage of routine

**NOTES:** Detailed information about usage and assumptions

**REQUIREMENTS:** Requirements from *PGS Toolkit Specification*, October 1993, which the routine satisfies

This User's Guide describes software tools which can be used by data providers who will produce products at their local institutions and then deliver those products to ECS DAACs for archival and distribution. The user calling interface is the same as that contained in the SDP Toolkit version 5.2.7 (*Release 6A SDP Toolkit User's Guide for the ECS Project, 333-CD-600-001)*. The tools described in this document consist of metadata formatting and accesss tools and time and date conversion tools.

It is expected that users of this software will use it in conjunction with HDF and HDF-EOS data formatting and access software.

- **HDF-EOS Library User's Guide for the ECS Project, Volume 1: Overview and Examples [Document Number 170-TP-500]**

The *HDF-EOS User's Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document will serve as a user's guide for the HDF-EOS file access library developed for ECS. Upon reading this document, the reader should have a thorough understanding of each data model and corresponding programming interface provided as part of HDF-EOS. Specifically, this user's guide contains an overview of each data model, a complete function-by-function reference for each software interface and sample programs illustrating the basic features of each interface.

The reader should note that this paper does not discuss the HDF structures underlying HDF-EOS nor the specific conventions employed. For more information on HDF, its design philosophy and its logical and physical formats, the reader is referred to NCSA documentation listed in Section 2.2, Applicable Documents. For more information on the conventions employed by HDF-EOS, the reader is referred to the various design white papers listed in Section 2.2.

*Important Note:*

The FORTRAN-literate reader is cautioned that dimension ordering is row major in C (last dimension varying fastest), whereas FORTRAN uses column-major ordering (first dimension varying fastest). Therefore, FORTRAN Programmers should take care to use dimensions in the reverse order to that shown in the text of this document.. (FORTAN code examples are correct as written.)

This document is intended for use by anyone who wishes to write software to create or read EOS data products. Users of this document will likely include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **HDF-EOS Library Users Guide for the ECS Project, Volume 2: Function Reference Guide [Document Number 170-TP-501]**

The *HDF-EOS Software Reference Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This software reference guide is intended for use by anyone who wishes to use the HDF-EOS library to create or read EOS data products. Users of this document will include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **EOSView Version 3.1 Users Guide for the ECS Project [Document Number 445-TP-006]**

The EOSView User's Guide for the ECS Project was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document will serve as a user's guide for the EOSView data verification tool, developed for ECS. The reader should have an understanding of the user interface and the functionality provided with the tool. A cursory understanding of HDF and HDF-EOS data structures is recommended, but not required.

Information on HDF-EOS can be found in the HDF-EOS Users Guide for the ECS Project. Information on HDF can be found in the NCSA HDF User's Guide.

This document is intended for use by anyone who wished to verify or inspect EOS data products written as HDF-EOS or as HDF files. Users of this document will include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products, i.e., scientists and researchers.

- **HDF-EOS Library User's Guide for the ECS Project, Volume 1: Overview and Examples [Document Number 170-TP-510]**

The *HDF-EOS User's Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document will serve as a user's guide for the HDF-EOS file access library developed for ECS. Upon reading this document, the reader should have a thorough understanding of each data model and corresponding programming interface provided as part of HDF-EOS. Specifically, this user's guide contains an overview of each data model, a complete function-by-function reference for each software interface and sample programs illustrating the basic features of each interface.

The reader should note that this paper does not discuss the HDF structures underlying HDF-EOS nor the specific conventions employed. For more information on HDF, its design philosophy and its logical and physical formats, the reader is referred to NCSA documentation listed in Section 2.2, Applicable Documents. For more information on the conventions employed by HDF-EOS, the reader is referred to the various design white papers listed in Section 2.2.

*Important Note:*

The FORTRAN-literate reader is cautioned that dimension ordering is row major in C (last dimension varying fastest), whereas FORTRAN uses column-major ordering (first dimension varying fastest). Therefore, FORTRAN Programmers should take care to use dimensions in the reverse order to that shown in the text of this document.. (FORTAN code examples are correct as written.)

This document is intended for use by anyone who wishes to write software to create or read EOS data products. Users of this document will likely include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **HDF-EOS Library Users Guide for the ECS Project, Volume 2: Function Reference Guide [Document Number 170-TP-511]**

The *HDF-EOS Software Reference Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This software reference guide is intended for use by anyone who wishes to use the HDF-EOS library to create or read EOS data products. Users of this document will include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **HDF-EOS Library User's Guide for the ECS Project, Volume 1 Overview and Examples [Document Number 170-TP-600]**

The *HDF-EOS User's Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document will serve as a user's guide for the HDF-EOS file access library developed for ECS. Upon reading this document, the reader should have a thorough understanding of each data model and corresponding programming interface provided as part of HDF-EOS. Specifically, this user's guide contains an overview of each data model, a complete function-by-function reference for each software interface and sample programs illustrating the basic features of each interface.

The reader should note that this paper does not discuss the HDF structures underlying HDF-EOS nor the specific conventions employed. For more information on HDF, its design philosophy and its logical and physical formats, the reader is referred to NCSA documentation listed in Section 2.2, Applicable Documents. For more information on the conventions employed by HDF-EOS, the reader is referred to the various design white papers listed in Section 2.2.

*Important Note:*

The FORTRAN-literate reader is cautioned that dimension ordering is row major in C (last dimension varying fastest), whereas FORTRAN uses column-major ordering (first dimension varying fastest). Therefore, FORTRAN Programmers should take care to use dimensions in the

reverse order to that shown in the text of this document. (FORTRAN code examples are correct as written.)

This document is intended for use by anyone who wishes to write software to create or read EOS data products. Users of this document will likely include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **HDF-EOS Library Users Guide for the ECS Project, Volume 2: Function Reference Guide [Document Number 170-TP-601]**

The *HDF-EOS Software Reference Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This software reference guide is intended for use by anyone who wishes to use the HDF-EOS library to create or read EOS data products. Users of this document will include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **HDF-EOS Interface Based on HDF5, Volume 1: Overview and Examples [Document Number 175-TP-510]**

The *HDF-EOS User's Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This document will serve as a user's guide for the HDF-EOS file access library developed for ECS. Upon reading this document, the reader should have a thorough understanding of each data model and corresponding programming interface provided as part of HDF-EOS. Specifically, this user's guide contains an overview of each data model, a complete function-by-function reference for each software interface and sample programs illustrating the basic features of each interface.

The reader should note that this paper does not discuss the HDF structures underlying HDF-EOS nor the specific conventions employed. For more information on HDF, its design philosophy and its logical and physical formats, the reader is referred to NCSA documentation listed in Section 2.2, Applicable Documents. For more information on the conventions employed by HDF-EOS, the reader is referred to the various design white papers listed in Section 2.2.

*Important Note:*

The FORTRAN-literate reader is cautioned that dimension ordering is row major in C (last dimension varying fastest), whereas FORTRAN uses column-major ordering (first dimension varying fastest). Therefore, FORTRAN Programmers should take care to use dimensions in the reverse order to that shown in the text of this document.. (FORTAN code examples are correct as written.)

This document is intended for use by anyone who wishes to write software to create or read EOS data products. Users of this document will likely include EOS instrument team science software

developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **HDF-EOS Interface Based on HDF5, Volume 2: Function Reference Guide [Document Number 175-TP-511]**

The *HDF-EOS Software Reference Guide for the ECS Project* was prepared under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

This software reference guide is intended for use by anyone who wishes to use the HDF-EOS library to create or read EOS data products. Users of this document will include EOS instrument team science software developers and data product designers, DAAC personnel and end users of EOS data products such as scientists and researchers.

- **IST Capabilities Document for the ECS Project [Document Number 343-TP-001]**

The Instrument Support Toolkit (IST) Capabilities Document has been written to provide a focal point to disseminate IST functionality, concepts and interfaces. The IST is being designed as an integrated entity of the FOS. From a design perspective, the IST capabilities are functionally similar to the EOC workstation capabilities with a few exceptions. However, there are unique operational characteristics associated with the distinct instruments. Thus, the objective of this document is to capture the capabilities, functionality and key items associated with the IST in one document. This issue was identified and addressed in the System Design Review (SDR) RID # 33.

This September 1995 version of the document is the last one that will be produced. The information contained within this document will be carried forward and updated in future volumes of DID 611/OP3, Operator's Manuals.

- **Impact of Multi-Threaded Processes on the ECS Project [Document Number 420-TP-013]**

The purpose of this white Paper is to provide an overview of the potential impact that the use of multi-threaded processes may have on the development and/or maintenance of the ECS.

This document has been written to:

1) help management in risk assessment and mitigation
2) identify non-thread safe COTS software used by this project that pose risk
3) recommend solutions and/or work around in using non-thred safe COTS software
4) provide guidelines to application developers for writing thread safe applications

Reviewers of this document are expected to be release system architects, the POCs for each COTS software product and the SEPG manager. Procurement Managers also have to be aware of this document and its impact in future software purchase.

- **Backus-Naur Format (BNF) Representation of the B.0 Earth Science Data Model for the ECS Project [Document Number 420-TP-016]**

This paper presents four views of the ECS B.0 Earth Science Data Model (420-TP-016-001) through addendum 3 (12/98) using Backus-Naur format. This technical paper supersedes the B.0 BNF (420-TP-016-002) published in December 1997. The purpose of these views is to depict the optionality of the various classes and attributes in the data model from the viewpoint of the data and metadata providers. Three of these views are based on the science product categories defined by the Data Model Working Group (DMWG) meeting in the summer of 1995. This is done in recognition of the fact that to demand a full set of attributes for all data collections in ECS is unnecessary and possibly very costly for migrated data sets. The fourth, minimal view is added to represent the metadata requirements for non-science or system collections. This view is the "lowest common denominator" of metadata required by the system to insert a granule and is only the only level; enforced by the system. The minimal view also represents the minimum metadata attributes that are mandatory. Equally to make all or most attributes optional would allow the possibility of having valuable data sets not fully described and therefore inadequately documented and serviced. The categories of data products in relation to the amount of level of metadata support required are defined as follows:

**Minimal** level of metadata is the minimum number of attributes needed by the system to insert a granule. This level is required for non-science or system collections, which will not be distributed as products. This level of service is enforced by SDSRV (Metadata Database Schema).

**Limited** level of metadata includes those **Minimal** attributes required by the system and additionally those **Limited** attributes needed to identify the science content of the collection to the Global Change Master Directory (GCMD). Data providers may provide metadata above and beyond this level as desired. Compliance with this level is not enforced and is the responsibility of the metadata provider.

**Intermediate** level of metadata is required for products generated outside of EOSDIS but used within EOSDIS (ancillary, level 0, campaign, Landsat 7 and TRMM). It could also be applied V0 data sets migrated to ECS (especially those reformatted to HDF-EOS) as well as special products. Compliance with this level is not enforced and is the responsibility of the metadata provider.

**Full** level of metadata is required for products generated within EOSDIS. Compliance with this level is not enforced and is the responsibility of the metadata provider. The more comprehensive the metadata supplied, the more comprehensive the services supported. The major service is the sophistications of the search and the amount of supporting metadata, which can be retrieved.

- **Release B.1 Earth Science Data Model for the ECS Project [Document Number 420-TP-017]**

The purpose of this technical document is to provide a baseline for the Release B.1 Earth Science Data Model for the ECS Project, which illustrate, specify and communicate the design of the ECS earth science. This technical paper represents the Release B.1 design of the ECS

earth science data model, useful to designers, developers and managers. The earth science metadata model represented in this document is a practical means of assuring the consistency of data requirements across subsystems and releases and supporting the data standardization necessary for total system interoperability within heterogeneous open systems environment.

- **Change Pages for Release B SDPS Data Server Subsystem Design Specification for the ECS Project [Document Number 430-TP-008]**

This technical paper provides change pages for the Release B SDPS Data Server Subsystem Design for the ECS Project, Contract Data Requirement List (CDRL) item number 046, with requirements specified in Data Item Description (DID) 305/DV2, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), contract NAS5-60000.

The Release B Data Server Subsystem Design Specification defines the design of the subsystem. It defines the Data Server Subsystem computer software and hardware architectural design, in accordance with the ECS level 4 requirements.

These change pages provide updated detailed design material for the Science Data Server (SDSRV) and Document Data Server (DDSRV) Computer Software Configuration Items (CSCIs). In addition to the detailed design sections for these two CSCIs, other sections of the document have been updated as necessary to reflect changes associated with these two CSCIs.

This document reflects the February 7, 1996 Technical Baseline maintained by the contractor configuration control board in accordance with the ECS Technical Direction Number 11, dated December 6, 1994.

- **Guide for ECS Converted Ancillary Products [Document Number 160-TP-015]**

This document will serve as a user guide for the access to the following products:

  - NCEP 1-Degree Aviation Model (AVN) - (HDF-EOS Grid)
  - NCEP 1-Degree Global Assimilation Model (GDAS) Product - (HDF-EOS Grid)
  - NCEP TOVS OZONE Daily Product - (HDF-EOS Grid)
  - NCEP -- PREPQC Quality Controlled Observation Data - (HDF-EOS Point)

This document only briefly revisits the basic concepts of HDF and HDF-EOS (see section 7) and the user not familiar with these concepts are referred to other literature on these topics that cover them in more detail. However, the user is expected to be familiar with the C programming language since the code samples contained in this document are written in that language.

- **Operations Scenarios - ECS Release B.0 Impacts [Document Number 220-TP-001]**

This document provides temporary update to Release B SDPS/CSMS Operations Scenarios for the ECS Project (605-CD-02-001). The partition of ECS Release capabilities between Release B.0 and B.1 introduces capability limitations that effect some of the 605 scenarios. This paper presents the limitations on the 605 operations scenarios that may incur during the Release B.0

time frame. The objective of this paper is not to rewrite the higher level descriptions of operations scenarios, but to pinpoint the capability limitations in the drill down scenarios. For easy cross-reference, the title of each subsection uses the same drill down scenario title. To fully address the Release B.0 work-arounds documented in the Release B Replan Functionality by Phase for the ECS Project (410-TP-004-001), two new scenarios are developed and presented in this paper.

- **EDC Release B Installation Plan (First Procurement) for the ECS Project [Document Number 800-TP-007]**

This plan describes the activities and schedules associated with the installation of Ecs release B first procurement hardware and software. The plan is published to document the agreement between the EDC DAAC and ECS. The plan specifies to the EDC DAAC personnel and the ECS installation team the requirements, coordination and preparation needed to ensure the equipment and software installation is accomplished on schedule and with the least possible disruption to ongoing DAAC site operations. The plan contains a description of the activities, installation schedule, planned LAN configuration, hardware configurations and planned equipment layouts. This plan also reflects consideration of major impacts to EDC in later Release B procurements through Release D as to planning the placement of equipment in the EDC DAAC.

This plan applies the information obtained from a site survey conducted in February 1996. The plan describes the activities for the installation of the Release B first procurement hardware only. It does not address the total Release B requirements that were presented in the Release B EDC Facilities Plan for the ECS project, dated May 1994. That document provided the requirements for space, power, air conditioning and the necessary working environments for equipment and people for the entire Release B hardware that was known at that particular time. Separate Installation Plans will be written at later dates to cover the installation of equipment for later Release b procurements.

- **NSIDC Release B0 Installation Plan [Document Number 800-TP-010]**

This plan describes the activities and schedules associated with the installation of ECS Release B first procurement hardware and software. The plan is published to document the agreement between the NSIDC DAAC and ECS. The plan specifies to the NSIDC DAAC personnel and the ECS installation team the requirements, coordination and preparation needed to ensure the equipment and software installation is accomplished on schedule and with the least possible disruption to ongoing DAAC site operations. The plan contains a description of the activities, installation schedule, planned LAN configuration, hardware configurations and planned equipment layouts. This plan also reflects consideration of major impacts to NSIDC in later Release B procurements through Release D as to planning the placement of equipment in the NSIDC DAAC.

This plan applies the information obtained from a site survey conducted in February 1996, September 1996 and April 1997. The plan describes the activities for the installation of the Release B0, Test Bed and Sun Platform Replacement hardware. It does not address the total Release B requirements that were presented in the Release B NSIDC Facilities Plan for the ECS Project dated May 1994. That document provided the requirements for space, power, air

conditioning and the necessary working environments for equipment and people for the entire Release B hardware that was known at that particular time. Separate Installation Plans will be written at later dates to cover the installation of equipment for later Release B procurements.

- **Release B1 ASF Installation Plan [Document Number 800-TP-012]**

This plan describes the activities and schedules associated with the installation of ECS Release B first procurement hardware and software at the ASF. The plan is published to document the agreement between the ASF DAAC and ECS. The plan specifies to the ASF DAAC personnel and the ECS installation team the requirements, coordination and preparation needed to ensure the equipment and software installation is accomplished on schedule and with the least possible disruption to ongoing DAAC site operations. The plan contains a description of the activities, installation schedule, planned LAN configuration, hardware configurations and planned equipment layouts.

This plan applies the information obtained from a site survey conducted in April 1998. The plan describes the activities for the installation of the Release B1. It does not address the full Release B requirements that were presented in the Release B ASF Facilities Plan for the ECS Project dated May 1994. That document provided the requirements for space, power, air conditioning and the necessary working environments for equipment and people for the entire Release B hardware that was known at that particular time. Separate Installation Plans will be written at later dates to cover the installation of equipment for later Release B procurements.

- **Release B (EOS-AM1/Landsat-7) SDPS/CSMS IDR Review Guide for the ECS Project [Document Number 510-TP-003]**

This technical paper is provided to assist in reviewing the Release B (EOS-AM 1/Landsat) SDPS/CSMS Incremental Design Review (IDR) documentation set and to prepare for participation in the upcoming Release B IDR session.

This document is not a deliverable item under the EOSDIS Core System (ECS) contract and is provided solely as a convenience for the reviewers. Accordingly, this technical paper itself is not subject to comment.

This guide contains material addressing the following topics:

- ECS development organizations and the Release B IDR
- IDR Objectives
- Scope of Release B
- Summary of organizations participating in IDR
- IDR deliverable documents
- Other relevant documents
- Documentation road map\
- Draft agenda for the IDR briefing October 30 - November 3, 1995

- **NASA's Earth Observing System Data and Information System (EOSDIS): An Integrated System for Processing, Archiving and Disseminating High-Volume Earth Science Imagery and Associated Products [Document Number 215-TP-001]**

The Earth Observing System Data and Information System (EOSDIS) is being developed by NASA's Goddard Space Flight Center to acquire a comprehensive, global, 15-year data set containing several petabytes of data. EOSDIS will command and control the series of EOS satellites, as well as provide distributed data processing, archival and distribution services across eight service provider sites. This paper provides an overview of the core components of EOSDIS focusing on the system capabilities provided for planning and processing science data products.

- **Plan for Achieving Required ECS Throughput Performance [Document Number 241-TP-002]**

This technical paper defines the plan for assuring that the EOSDIS Core System (ECS) will meet system throughput and response time requirements.

The scope is restricted to the Science Data Processing Segment and the Communications and System Management Segment.

- **ECS Reuse: Advertising Service Primer [Document Number 170-TP-011]**

This paper provides an overview of the Advertising Service component of the ECS project. This paper was written as part of an ECS software reuse task in collaboration with NASA, the Department of Energy Atmospheric Radiation Measurement (ARM) division and Raytheon Systems. The reuse task involved disconnecting the Advertising Service code from the ECS to generate a stand-alone system. This Primer describes the primary features of the Advertising Service component, optional features, a description of the advertising process, system requirements, installation guidelines and a list of related documents.

- **Year 2000 Plan for the ECS Project [Document Number 212-TP-002]**

This technical paper is a plan by which Year 2000 (Y2K) ECS system analysis and upgrades are to be accomplished, including the early development of Y2K level 4 requirements. ECS Technical Direction Number 28, *Year 2000 Requirements*, and updates to the ECS Statement of Work in accordance with Contract Modification 82, directed ECS to develop and document this plan.

- **Year 2000 SDPS Test Plan for the ECS Project [Document Number 162-TP-001]**

The Year 2000 SDPS Test Plan for the ECS Project serves as the detailed test plan for ECS year 2000 compliance testing as specified in the *Year 2000 Plan for the ECS Project 212-Wp-001-002*. This document provides a summary of the system level approach to Y2K compliance verification that led to the Development of this test plan. The plan also outline the test procedures and environment used to verify Y2K compliance of the ECS. Y2K testing will occur concurrently with Drop 5A testing. Technical Direction Number 28, *Year 2000 Requirements*, and updates to the ECS Statement of Work in accordance with Contract Modification 82, directed ECS to develop and document this plan.

The purpose of Year 2000 testing is to verify Year 2000 compliance of the ECS at the subsystem and end-to-end level. Executing functional test cases will carry this out. Some of these test cases have been developed from existing System Verification (SV) and Acceptance Test (AT) test cases and some new test cases that have been developed.

This test plan applies to verification of Year 2000 compliance of the ECS Project at the subsystem and system levels by the System Verification and Acceptance Test Organization. For more information on ECS Year 2000 compliance, consult *Year 2000 Plan for the ECS Project, 212-WP-001-002*.

- **Year 2000 Summary for the ECS/SDPS Project [Document Number 210-TP-004]**

The purpose of Year 2000 testing is to verify Year 2000 compliance of the ECS/SDPS system at the subsystem and end-to-end level. Executing functional test cases is the approach to demonstrating compliance. Some of the test cases were developed from existing System Verification (SV) and Acceptance Test (AT) test cases and some new test cases were developed. Specific Y2K test dates used for ECS/SDPS Y2K testing included:

January 1, 2000 One-Year Look-Ahead Date into Next Century

February 28, 2000 (Leap Year Test 60$^{th}$ day of the year

February 29, 2000 Uncommon Leap Year

December 31, 2000 (366$^{th}$ Day of Uncommon Leap Year)

Y2K testing occurred with Drop 5A. Technical Direction Number 28, Year 2000 Requirements, and updates to the ECS Statement of Work in accordance with Contract Modification 82, which directed ECS/SDPS to develop and document this testing.

- **DAAC Addressing Study for the ECS Project [Document Number 713-TP-001]**

This study will examine different strategies to support re-addressing of the Production network and its connectivity to EMSnet (ESDIS Mission Support network). EMSnet is also known as EBnet.

While this study can apply to any DAAC, it is limited to only the EDC and NSIDC DAACs. These DAACs are not located at NASA facilities and will require the use of non-NASA communication circuits when network bandwidth requirements increase. However, the analysis presented in this paper also applies to the other DAACs, VATC and PVC. The tasks would be the same but the duration of each task could vary.

- **Java DAR Tool Requirements for the ECS Project [Document Number 221-TP-007]**

The purpose of this paper is to outline the requirements of the Java DAR Tool (JDT) as they are understood at the time of the JDT Requirements Review to solidify the requirements base for the design of the JDT. The purpose of the Level 4 requirements in this paper is to show the functionality needed to design the JDT and provide enough information to software engineers and testers to design and test the JDT effectively. The JDT is a tool for submitting, modifying and querying the status of ASTER data acquisition requests to the ASTER Ground Data System

(GDS) in Japan. A DAR is a request to take ASTER instrument data from the satellite. The need for the JDT is established in contract modification 72, where the Level 3 requirement for a Web interface for submitting DARs is established. This paper establishes an initial set of detailed requirements for the JDT. All subsequent modifications to these requirements after the final version of this paper will be maintained through the normal ECS configuration control and requirements maintenance procedures for ECS Level 4 requirements.

- **Release B Document Tree [Document Number 222-TP-006]**

The purpose of this Technical Paper is to identify the principal ECS system and Release B-specific requirements and design documents to illustrate their hierarchical relationships in a document tree. The document tree includes summary information about each document such as its document number, title, date of the current version, responsible CCB and the document's release schedules. The document tree, however, is not intended to reflect the flow of requirements from higher-level documents to lower-level documents.

This Technical Paper is approved and controlled by the Release B CCB. It does not require formal Government review or approval. Changes to this document will be initiated by submittal of a formal CCR to the Release B CCB. Questions regarding technical information contained within this paper should be addressed to George Percivall, 301-925-0368, gperciva@eos.hitc.com.

- **ECS Release B Level 4 Requirements Workshop Issues [Document Number 222-TP-011]**

The purpose of this Technical Paper is to report the disposition of issues identified during the Release B Level 4 Requirements workshop. The workshop was held July 25 to 27, 1995. In addition to the complete list of issues in the appendix, various summaries are given to describe the issues along with several major plans or actions, which have been undertaken to close remaining issues. This document is being prepared to provide the status of L4 issues for the Release B Incremental Design Review (IDR). Based on the analysis in this paper, there are nine open issues and activities related to the Release B Level 4 requirements as identified in section 2.4.

- **ECS Response to Comments on the January 1997 Version of ECS External Data Traffic Requirements (223-CD-001-004) [Document Number 152-TR-000-049]**

This document, (152-TR-000-049), addresses all ESDIS comments on the January 1997 version of DID 223 (ECS External Data Traffic Requirements). It is also part of the response to the April 14, 1997 ESDIS letter rejecting the document. The May 1997 version of the CDRL (DID 223), which has incorporated most of the editorial comments will be delivered along with this document.

# Abbreviations and Acronyms

A complete list of ECS Acronyms can be found in the technical paper 152-TP-001-006, Acronyms for the EOSDIS Core System (ECS) Project.

| | |
|---|---|
| a.k.a. | also known as |
| AM1 | EOS AM Mission Spacecraft 1, morning equator crossing spacecraft series -- ASTER, CERES, MISR, MODIS and MOPITT instruments |
| ASTER | Advanced Spaceborne Thermal Emission and Reflection Radiometer (formerly ITIR) |
| B0SOT | B.0 Search and Order Tool |
| CCB | Configuration Control Board |
| CCR | Configuration Change Request |
| CDRD | Contract Data Requirements Document |
| CDRL | Contract Data Requirements List |
| CERES | Clouds and Earth's Radiant Energy System |
| COLOR | Ocean Color (see EOS Color) |
| COTS | Commercial off the Shelf |
| CSCI | Computer Software Configuration Item |
| CSMS | Communications and Systems Management Segment |
| DAAC | Distributed Active Archive Center |
| DADS | Data Archive and Distribution Segment |
| DAR | Data Acquisition Request |
| DCN | Document Change Notice |
| DFRD | Data Format Requirements Document (EDOS) |
| DID | Data Item Description |
| DMR | Detailed Mission Requirements |
| ECS | EOSDIS Core System |
| EDG | EOS Data Gateway |
| EDOS | EOS Data and Operations System |
| EGS | EOS Ground System |

| | |
|---|---|
| EMOS | ECS Mission Operations Segment (Formerly FOS) |
| EOS | Earth Observing System |
| EOS COLOR | EOS Color Mission |
| EOSDIS | Earth Observing System Data and Information System |
| ERS-1 | European Remote Sensing Satellite-1 |
| ESA | European Space Agency |
| ESDIS | Earth Science Data and Information System (GSFC Code 505) |
| ESDT | Earth Science Data Type |
| ESOD | Earth Science On-line Directory |
| FOS | Flight Operations Segment |
| FP&PD | Flight Projects and Project Directorate |
| F&PRS | Functional and Performance Requirements Specification |
| GDAAC | Goddard Distributed Active Archive Center |
| GSFC | Goddard Space Flight Center |
| HWCI | Hardware Configuration Item |
| ICD | Interface Control Document |
| IGS | International Ground Station |
| IRD | Interface Requirements Document |
| ISO | International Standards Organization |
| I&T | Integration and Test |
| LAMS | Landsat 7 Archive Management System |
| LPS | Landsat 7 Processing System |
| MISR | Multi-Angle Image SpectroRadiometer |
| MODIS | Moderate Resolution Imaging SpectroRadiometer |
| MOPITT | Measurements Of Pollution In The Troposphere |
| NASA | National Aeronautics and Space Administration |
| NOAA | National Oceanic and Atmospheric Administration |
| ODL | Object Description Language |
| OSI | Open Systems Interconnection |
| PGS | Product Generation System (ASTER and ECS Element) |

| | |
|---|---|
| SCF | Science Computing Facility |
| SIPS | Science Investigator-Led Processing System |
| SPSO | Science Processing Support Office |
| SSRP | Science System Release Plan |
| SUBSRV | Subscription Server |
| TRMM | Tropical Rainfall Measuring Mission (joint U.S.-Japan) |
| UARS | Upper Atmosphere Research Satellite |
| URL | Universal Resource Locator |
| V0 | Version Zero |

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